AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLIV
Number 25

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, JUNE 23, 1921

Thirty-five cents a copy
Three dollars a year

Entered as second-class matter Jan. 2, 1903, at the post office at New York, N. Y., under the Act of March 3, 1879.

One of the Crankcase Tapping Machines in the Continental Plant at Detroit that taps all the bolt holes in a crankcase in one operation.

Performance maintained over a long period of years has placed the Red Seal Motor in the niche it holds today in public confidence. What other factor could bring the public to the point where it selects a particular car or truck from the maelstrom of passing traffic and, with an all-sufficient gesture, says "It's equipped with 'The Continental Red Seal?'". But to the motor vehicle manufacturer, there are other important considerations that prompt the selection of the Red Seal Motor as standard equipment—the unequalled facilities of two of the largest and most completely equipped motor manufacturing plants in the world, the experience of an organization that has concentrated on motor manufacture for years and the bulwark of financial strength that the world knows is behind—The Continental Red Seal.

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A. **Factories: Detroit and Muskegon**

Largest Exclusive Motor Manufacturers in the World

Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS

AUTOMOTIVE INDUSTRIES
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VOL. XLIV. NEW YORK—THURSDAY, JUNE 23, 1921 No. 25

Team Work Needed in Bucking the Sales Resistance Line

Now that the price question is in eclipse for the time being, there are other important sales questions. Some of those that must be met by the industry are here set forth. These do not call for so much individual action, as action by the industry.

By Clyde Jennings

NOW is the time for all good men to rally to support of the industry. How well most of us remember writing the above line (with a slight difference) when we first attempted to use the typewriter.

And using the typewriter is about like David Harum's low bridge story. Practically every business executive smiles at references to his one-finger speed.

But let us begin on the topic actually under discussion.

The automotive industry has pretty well got the price troubles out of its system. It is now ready to sell the motor cars, if the public can be persuaded to buy, and the public can be persuaded if it is properly approached. There are, however, a number of serious questions now entering into the sale of motor cars that have not been serious in the past. It is in the solution of these problems that the assistance of "all good men" is needed. The questions that will be set forth are not questions for the Maxwell, the Dodge, the Buick, the Cadillac or the Pierce-Arrow to answer. They are questions for the industry to answer.

We all know what the stage setting has been in the past. It has been like this:

Every man, woman and child in the country has had the desire to own a motor car. It was only a question of the prospect getting money enough to buy one or the seller making terms long enough to permit the prospect seeing a chance to get it paid for eventually.

When either horn of this dilemma was met, the signature went on the dotted line and another car was started on its way to the used-car boneyard.

Times change and selling conditions and public opinion change with time. To-day the salesman hears many objections besides that of "I haven't the money." Any salesman to-day will tell you that:

It is easy to find a man who says:

I figure that I can buy a $1,000 car and pay a reasonable upkeep, but I cannot afford to pay $35 or more a month for garage space.

I can probably afford a car and a reasonable upkeep, but traffic regulations in this town are so bad there is no pleasure in keeping a car.

I can afford a car as things are now, but they are talking about raising the license fees and putting more taxes on the cars, and I am afraid.

I am waiting for the car that will go twice as far on the fuel.

I don't want to buy a car just to have it stolen.

My neighbor has a car. He is a safe driver, but the insurance people are making him pay as much insurance as any speed demon, and it's too much.

There are not enough good roads. Where I want to drive, it is a procession, not pleasure driving.

There is too much danger of killing people with a car; too much danger of being sent to jail.

My brother bought a car because he read how economical it was in operation, how silent and many other things. It won't do those things.

I am having troubles enough these days. Why should I buy a car and fight all of the time with repair men. You folks do not take care of your cars.

If we reduce these points a bit further, we get these lines of sales resistance:

Shelter in cities.
Traffic conditions.
Taxes.
Gasoline scarcity talk.
Car thefts.
Insurance abuses.
Highways.
Accident cry.
Foolish publicity.
Poor service.

These are actual lines of resistance in selling cars to-day. The public, according to reports from the men who actually sell the cars, is not much alarmed by the average life of the car and many other things that will, in time, come up for solution.

The public, it appears, is pretty well sold on the utility of the car and its internal combustion engine kindred, and the public has a great desire to own cars. But especially since last July 1, last year, a good many individual sections of the great public have been giving more and more thought to financial problems, as pertains to the individual, and the era of reckless expenditure has ended. It took the industry generally a long time to fully appreciate the individual's increased appreciation of the importance of his own pocketbook, but the recent price adjustments and the change appearing in the subject matter of the advertising indicate that an understanding of the present situation has been finally lodged in the sales mind of the industry.

Shelter

This is a question that can be solved only by proper encouragement to capital. It is very akin to the housing of families—only of less vital importance to the human race and the nation. It is important chiefly to those who have automotive vehicles for sale. The prospective buyer will not make any great exertions on his own behalf. It is the belief of many students of the situation that a proper canvass would show to capital that there is a productive field. Also that a new type of garage is needed. This should be a garage where the flat-resident owner can drive his car and lock it up. City car owners are tired of having tools and other articles left in the cars stolen. The practice of losing these articles and of being ordered to vacate garage space because they buy gas and oil elsewhere is an annoyance that may counterbalance the sense of satisfaction of owning a car.

Traffic

Traffic regulations are far from satisfactory. Generally speaking, in the small city they are too loose and in the large city they are too severe. Someone besides the police sergeant should study traffic needs and regulations. In each city the persons most concerned with the proper use of automotive vehicles should interest themselves to see that the existing regulations are properly enforced.

There was a time when this matter was entrusted entirely to the motor car owner. All are familiar with the present situation. Surely this question is of sufficient importance as a sales resistant to warrant attention. An automotive student recently visited a Massachusetts city. He said sales were at a standstill there because the downtown streets were so full of cars people were disgusted. He did not see the solution, but after some discussion he admitted that a proper enforcement of reasonable parking restrictions would do much to clear the streets. In larger cities parking space where car owners can pay for the service they want is required.

Taxes

This question has been much discussed and much effective work is being done by the Motor Conference Committee and by the N. A. C. C. Legislative Committee. It is only necessary here to say that this work is much too important to be neglected. A foundation of continuing work has been laid and it must be continued.

Gasoline Scarcity Talk

Once we all thought that when the price of gasoline dropped it would end the scarcity talk. But apparently it does not. So many scientists who view time only by geological ages have been writing of the end of the gasoline supply that they have made a pessimist of the ordinary man. There must be some reasonable counter-argument. Some persons who have carelessly read these articles are refusing to buy cars because they believe the supply of gasoline will run out before the car wears out.

There is another view of the gasoline situation that may be worthy of note. That is the small size of the gallons that some retailing machines turn out. This is especially a question where the motor vehicle owner is forced to rent shelter in a public garage, the kind that shelter most of the vehicles owned by apartment house dwellers and even in dwelling houses where no provision was made for a private garage. These short gallons also have a considerable effect on mileage-per-gallon records that owners pass to each other by word of mouth.

Car Thefts

Despite Federal laws and exposures of reward scandals in several of the larger cities, this evil flourishes. It is a serious sales resistant. In some states and cities an effort is being made to solve the problem. The motor vehicle is the most costly article that lends itself readily to theft. The best progress that has been made toward stopping thefts has been made under the encouragement of dealer associations. These efforts have demonstrated that when police and prosecuting officials are properly encouraged and assured of proper criticism in case of failure, and proper support in case of effort and proper credit in case of success that, they can materially change the situation.

Highways

This is not a new subject at all and the work is well under way. Now that the effort is being directed toward definite and well-defined ends, much progress is likely to be made. One important movement in the last year was the decision within the industry to stop the support of all wildcat schemes, which existed primarily to provide some nimble witted man with a job. The unity and earnestness of the industry in this cause is commendable.

Insurance

Ask any car owner about his insurance and you will get a rise out of him. Recently some steps have been taken by the insurance companies to right some of the most

flagrant wrongs, but much injustice still exists. The careful driver to-day feels that he is penalized because of the reckless person over whom he has not the slightest control. He feels that his good record amounts to nothing. Insurance folk are apt to think they have had small co-operation from car manufacturers. As a matter of fact, the insurance folk are having troubles of their own and they are ready to listen to constructive criticism. It is strange, but true, that there are no fundamental statistics on automobile accidents.

Accident Cry

While this article was being written a man who is financially interested in the industry came into the office and incidentally mentioned the "fear of injuring some one" as a great deterrent in his own case as to buying a car. He said that he heard many persons speak of this from day to day. Recent insurance company curves show that the 1921 automobile accident percentage per 1000 population is running higher than the 1920 curve.

Some recent statistics have indicated that the middle-sized cities are the worst offenders in this line. The usual idea is that it is the largest cities, but this idea is probably due merely to the fact that the numbers of those injured run higher, without a proper sense of proportion to population. There is opportunity here for research into the cause, time and place of accidents and then a broad educational campaign. This problem is closely linked with the general safety problems and even more closely linked with the regulation of traffic. At present the entire burden is passed to the driver. Much of it, doubtless, should go to the pedestrian. But accurate figures are lacking.

Foolish Publicity

Too much is promised for the car in hastily written publicity notices that have no object other than getting people to read them. They make all sorts of promises as to silent performance, mileage of gasoline and tires and many other promises that cannot be kept.

Also the public is getting a very queer impression of the sagacity of leaders in this industry because of some of the quotations attributed to them in the public press. Some executives might learn a good deal if they would keep posted as to their published opinions.

Poor Service

It looks a good deal like butting your head against a stone wall to talk about better service being forced by the manufacturers. However, the success of some manufacturers who have begun to take this question seriously is decidedly encouraging. Undoubtedly the Factory Service Managers of the N. A. C. C. are doing a great work. They should be encouraged. As an offset to this, the manager of a large truck factory recently said that he made 10 per cent on his trucks and 25 per cent on his parts. Apparently the only obligation of this manufacturer toward his customers is to use him as a means of making money.

Among the persons who write to Automotive Industries on topics uppermost in their minds is George M. Brown, a pioneer dealer, who wrote recently:

"Several things happened to-day which brought to my mind rather forcibly the general character of the automotive industry, with which I have been associated for many years.

"That there is a strong tendency to a slump in the business is hardly to be denied, and it may not be entirely the price of cars. The upkeep to-day is a very serious factor. The high cost of repairs and the take it or leave it policy, very prevalent now, is not conducive to encourage even the purchase of a low-priced car.

"Years ago, when I was in the automobile business, my great aim was to satisfy my customers, even if the customer was somewhat unreasonable. A week or so ago my car needed new cylinder gaskets. These, on being applied, immediately blew out. On returning to the service station of the car I made a mild kick and was met with the retort, 'We don't make them, we only sell them.'

"I really think that many people are getting tired of a continual holdup because they happen to own a car. It may be necessary for some one to emulate the attitude of Admiral Simms and George M. Cohan and say a few words straight from the shoulder regarding some of the abuses outside the primary factory industry."

There is only one thing about this letter that is not satisfactory; that is that Brown does not give us credit for having hammered along these lines.

There is one thing very certain. With an article to sell like the motor car, a sales campaign that does not take service into consideration will never be a success.

Now this is not in any sense a "blue Monday" effort, nor is it designed to give expression to a grouch. But there is more to selling than naming a price and taking the article bought off of the shelf. No mercantile establishment ever laid the foundation for a fortune by merely wrapping up the merchandise. It is a fact, never-theless, that a lot of manufacturing companies are started without giving any study to the selling problem. A lot of them start without even looking over the field with a view of possible absorption of the product.

There will be nothing new in this article to good salesmen, but whether the subject on any part of it is new, it is time that there was unity in the effort to meet the condition.

Census Bureau's Summary Concerning Aircraft Manufacture

A PRELIMINARY statement of the general results of the 1920 census of manufactures with reference to aircraft has been issued by the Bureau of the Census, Department of Commerce, furnishing a detailed statement of the quantities and values of the different types of aircraft manufactured during the year 1919, prepared under the direction of Eugene F. Hartley.

Reports were received from 31 establishments engaged in the industry during 1919 showing products for the year valued at $14,372,643, as compared with 16 establishments in 1914 with products valued at $789,872. Of the 31 establishments reporting for the year 1919, 10 were located in New York; 4 in Ohio; 2 each in California, Massachusetts, and Missouri; and 1 each in Connecticut, Indiana, Illinois, Louisiana, Maryland, Nebraska, New Jersey, Pennsylvania, Rhode Island, Washington and West Virginia.

The following is a summary of statistics of the industry for 1919, the "All other products" reported consisting chiefly of airplane parts, engines, and repair work.

Number of establishments	31
Total value of products	$14,372,643
Airplanes:	
Number	432
Value	$3,466,452
Seaplanes:	
Number	230
Value	$4,580,016
Value of work done during year on airplanes and seaplanes not completed	$1,658,670
All other products, including parts and repair work	$4,667,505

Nearly 65 Miles on One Gallon of Benzol

New record is established in French Grand Prix fuel consumption test by Gregoire, Citroen and other small cars, as well as by some larger cars. Nearly all makes entered in 183 cu. in. class and smaller make over 30 m.p.g. Only stock cars were admitted. One Ford makes 38.81 m.p.g.

By W. F. Bradley

NEARLY 65 miles on one gallon of benzol was the record set up by Jean Porporato, driving a two-seater Gregoire light car with a four-cylinder 2.4 x 3.5 in. engine, in the French fuel consumption Grand Prix at Le Mans.

This was not the only record broken, for right along the line, from the small two-seaters of 61 cu. in. piston displacement to the full-sized seven-passenger touring cars, extraordinary figures were shown and old records were broken. There were five classes, of 1100, 1400, 2000, 3000 and 4500 cu. cm. displacement, in which the best performances were Porporato on Gregoire, 64.62 m.p.g.; Milcent, four-passenger open Citroen, 62.03 m.p.g.; Bocchi, four-passenger open De Dion Bouton, 49.09 m.p.g.; Korner, four-passenger open Ford, 38.81 m.p.g.; Artault, four-passenger open Voisin, 36.59 m.p.g.

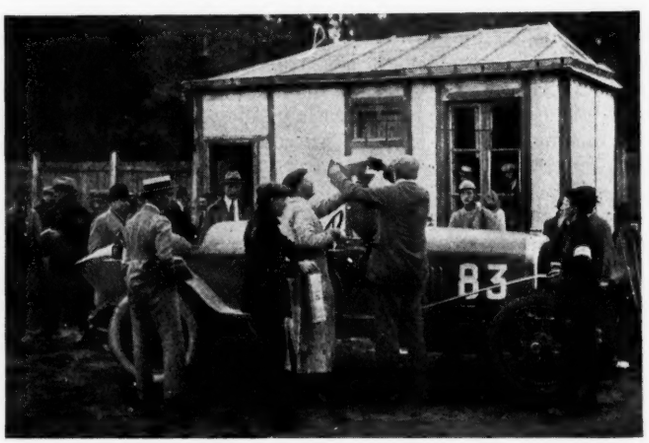
Each of the forty competitors was given a certain amount of fuel, according to piston displacement, seating capacity, weight and type of body, and all were sent away on a carefully guarded course about 4½ miles round, over which they had to run until the fuel supply was exhausted. The winner could be considered either as the one traveling the greatest distance, or the one showing the highest mileage per gallon. The results were different, according to which method of classification was employed. Thus, Milcent's Citroen went the greatest distance before stopping with an empty tank, but its mileage per gallon was less than that of Porporato's Gregoire. The Ford was first in its class on the basis of miles per gallon, but dropped down to seventh place on the basis of actual distance covered. In the big car class, too, Artault, on the open, sleeve-valve Voisin, was beaten by his teammate Cabaillot with a seven-passenger Voisin Sedan, on the basis of total miles run, for he put up a record of 79.39 compared with 76.84.

Competitors could select their own fuel, and in nearly all cases benzol was preferred to gasoline. Mixtures of gasoline and benzol were not used, and the few who did use gasoline preferred heavy grade to light fuel. Lacharnay equipped the Gregoire car which showed the highest mileage per gallon; Solex furnished the carbureter for the winners in the 1400, the 2000 and the 3000 cc. classes, while the Voisins in the 4500 cc. category had Zenith carbureters modified according to the ideas of the Voisin engineers.

The competition called forth the best work of French engineers and carbureter experts, and although the results obtained are not within the reach of the average automobile owner, they are valuable as an indication of directions in which economies can be made, and they are significant by reason of the improvement over the trials of a year ago. Only stock cars were admitted, but changes could be made when they had in view increased fuel efficiency. For instance, special camshafts and pistons could be used, the timing could be changed, compression increased, ignition and carbureter could be special, there could be electric heating for the carbureter and oil, if desired. It was forbidden, however, to change the type of engine, and if the standard product was an L-head engine it was forbidden to use an overhead valve type.

Speed was not sacrificed to fuel economy, except in a few cases. The big cars ran at 30 to 35 m.p.h., and in

Cars competing in the French fuel consumption Grand Prix



Filling the fuel tank of one of the cars (Voisin) prior to running in the French fuel consumption Grand Prix

the afternoon of the same day, without any adjustments in the meantime, many of them put up speeds of 60 m.p.h. for a distance of about 65 miles.

One of the features of the competition was the tendency to make use of crankcase induction. This was allowed under the rules, and interesting work was done by the Zenith engineers and by Cozette, a French carbureter expert. On a four-cylinder De Dion Bouton sedan, with four passengers, it was possible to get 70 miles to the gallon with a Zenith carbureter and crankcase induction. It is claimed that oil was not actually drawn from the base chamber, but the oily vapor suspended in the chamber was made use of. On a 20-hp. Darracq sedan, with four 3.3 x 5.1 in. cylinders, Cozette covered approximately 36 miles to the American gallon. In this case small quantities of oil were drawn from the base chamber, and after being vaporized in the exhaust manifold were passed into the intake manifold. No data is available to show exactly how much oil was consumed with this arrangement, but the engineers claim that the increase was not excessive. In certain cases, as, for instance, with engines having leaky crankcases, the normal oil consumption is hardly increased at all, for aspiration from the base chamber eliminates most of the leaks.

On the night before the competition the Solex Carbureter Co. protested against crankcase aspiration. Charles Faroux, the technical member of the jury, who had authorized this, withdrew, and allowed the remainder to vote, when a decision was given against allowing any air to be drawn from the crankcase. Zenith replied by withdrawing, thus pulling out of the competition a large number of De Dion Bouton cars and all the Peugeot machines. Cozette decided to remain in, but was put at a great disadvantage by having to modify everything during the night before the trials. A lot of jealous protests were lodged, one being put in against the Peugeots because they were not full width according to the rules. When the cars had been altered, they were protested because they were not stock models.

Arrangements to insure accuracy and prevent cheating were admirable. It was not allowed to use the standard tank, but instead a special receptacle had to be mounted either on the outside of the body, or inside when sedan bodies were used, so that it was always under the view of the observer, and had no hidden pipes. The course was divided into hundred yard sections, with official observers on each, as well as regular troops. After the tanks had been filled the cars were kept under military guard for the night and were pushed out to the starting line, where they were cranked by hand, for electric starters had to be either entirely dismounted or put out of commission. An observer connected with a rival firm was placed aboard each car and kept count of distance covered. As the course was marked off by posts at 100 yd. intervals, it was an easy matter to calculate the distance.

High compressions were common, and in some cases oil consumption was high. The Voisin sedan, with sleeve valve engine headed the list in this respect with a consumption of 1½ gal. of lubricating oil to cover 79 miles, while the gas consumption for the same distance was only 2.75 gal. The companion open Voisin consumed slightly more than half a gallon. One-fifth of a gallon was used by the Bignan-Sport sedan to cover 67 miles. All the others used extremely small quantities of lubricating oil.

	Cars and Drivers	Bore and Stroke	Distance Covered, Miles	Fuel Allowed U.S. Gal.	Miles per Gal.	Carbureter
	1100 cc. (67.2 cu. in.)					
1	Mathis, Kuntz	2.29x3.94	93.57	1.53 B.	61.15	Solex
2	Mathis, Sommier ...	2.29x3.94	92.39	1.61 B.	57.38	Solex
3	Majola, Doutre	2.32x3.54	76.79	1.55 B.	49.54	Claudel
4	Gregoire, Porporato.	2.44x3.58	72.39	1.12 B.	64.62	Lacharnay
	1400 cc. (85.4 cu. in.)					
1	Citroën, Milcent	2.56x3.94	94.91	1.53 B.	62.03	Solex
2	Citroën, Poulain.....	2.56x3.94	92.48	1.56 B.	59.28	Solex
3	Mathis, Lahms	2.36x3.94	90.08	1.53 B.	58.86	Solex
4	Mathis, Battaglia ..	2.36x3.94	87.96	1.55 B.	56.74	Solex
5	Citroën, Barbier	2.56x3.94	86.47	1.56 B.	55.43	Solex
6	Citroën, Delva	2.56x3.94	76.64	1.37 B.	55.94	Solex
7	Citroën, Tallard	2.56x3.94	67.25	1.55 B.	43.38	Eureka
8	Citroën, Collière	2.56x3.94	59.87	1.49 B.	40.11	Solex
9	Citroën, J. Monseny.	2.56x3.94	51.68	1.48 G.	34.91	Solex
	2000 cc. (122 cu. in.)					
1	De Dion Bouton, Bocchi	2.76x4.73	78.55	1.60 B.	49.09	Solex
2	Chenard & Walcker, Léonard	2.72x5.12	76.98	1.79 B.	43.00	Solex
3	Chenard & Walcker, L. Chenard	2.72x5.12	67.56	1.78 B.	37.95	Solex
4	Corre La Licorne, Collomb	2.56x4.73	65.07	1.51 B.	43.08	Solex
5	De Dion Bouton, Labaume	2.76x4.73	63.09	1.58 B.	39.93	Solex
6	Suère, Lamberton...	2.76x4.73	53.08	1.64 G.	32.36	Solex
7	Alva, Compertz	2.56x4.73	52.46	1.53 B.	34.28	Mob.
	Cars and Drivers	Bore and Stroke	Distance Covered, Miles	Fuel Allowed U.S. Gal.	Miles per Gal.	Carbureter
	3000 cc. (183 cu. in.)					
1	Delahaye, Barateau.	3.35x5.12	71.75	1.96 B.	36.60	Solex
2	Talbot-Darracq, Mauriceau	3.35x5.12	69.79	2.23 B.	31.29	Cozette
3	Delahaye, Brun	3.35x5.12	65.51	1.87 G.	35.03	Solex
4	La Buire, Lacharnay	2.95x5.90	64.23	1.96 B.	32.77	Lacharnay
5	Grégoire, Penard ...	2.95x5.12	64.17	1.82 B.	35.25	Lacharnay
6	Delahaye, Antelme..	3.35x5.12	63.91	1.96 B.	32.60	Cozette
7	Ford, Korner	3.75x4	58.74	1.51 G.	38.81	Solex
8	Ford, Bocquet	3.75x4	55.67	1.51 B.	36.86	Solex
9	Colombe, Pestour...	3.75x4	53.75	1.67 B.	32.18	
10	Ford, Devarenne ...	3.75x4	45.49	.....	.....	
11	Ford, Torres	3.75x4	35.95	1.45 G.	24.78	
12	Ford, Kemf	3.75x4	34.96	1.55 G.	22.55	
13	Ford, Torchet	3.75x4	34.89	1.61 G.	21.67	
14	Ford, Monseny	3.75x4	27.70	1.56 B.	17.30	
15	Ford, Chaumel	3.75x4	15.92	1.57 B.	10.14	
	4500 cc. (275 cu. in.)					
1	Voisin, Cabaillot....	3.75x5.52	79.39	2.75 B.	28.86	Zenith
2	Voisin, Artault	3.75x5.52	76.84	2.10 B.	36.59	Zenith
3	Delahaye, Convert..	3.35x5.12	67.79	2.39 B.	28.36	Cozette
4	Bignan, De Marne..	3.62x5.12	67.40	2.46 B.	27.39	Claudel
5	Mors, Maudiquet	3.54x5.52	59.80	2.05 B.	29.19	Solex

B = benzol. G = gasoline.

New Coolant Circulating Pump

THERE has recently been installed at the Cleveland plant of The Steel Products Co. a number of Ross "two way" centrifugal pumps for delivering oil or water to drill presses, lathes, tapping machines, centering machines, screw machines, etc. One pump provides a ⅜-in. stream for six high-speed drill presses. Another handles the supply for twenty-one high-speed drill presses, a third handles six tapping machines, a fourth six centering machines, etc.

Where a battery of machines is cared for by a single pump, a reservoir with an overflow is placed in the main distributing line, thus providing gravity feed for normal use. When pressure is required the overflow may be plugged.

One advantage claimed for the Ross pump is that it needs to be primed only when installed. The pump is designed to deliver a flow of liquid from the same outlet regardless of direction of rotation of the impeller blade. This is required for machines which run in both directions, such as screw machines.

The pump has oilless bearings and graphite asbestos packing, and no bearings or gears come in contact with the cooling fluid. This feature is very important, as steel chips are carried along by the compound. The impeller consists of four light pieces of vanadium spring steel and is designed so that there is no end thrust. The gear ratio is four to one, giving a high impeller speed when belted to a slow pulley.

A New Transmission Designed to Facilitate Gear Shifting

Secondary clutch completely disconnects the transmission from propeller shaft during interval of gear shifting. Shifting is accomplished by imparting a rotary motion to a slotted camshaft in gear box which actuates the shifting yokes. Shifting lever mounted on steering column.

A TRANSMISSION gearset which has been under development for the past several years is now being put into production and is being offered automobile and truck manufacturers. A number of advantages, including a great increase in the ease of gear shifting, and absence of clash, are claimed. In place of the ordinary type of gear shift lever, an accessible steering column control is provided. Increased engine flexibility and increased fuel economy are also claimed to result from the use of this gearset, the former from the particular construction of the gearbox and the latter from the possibility of operating under more advantageous gear conditions.

Elimination of the gearshift lever is made possible by the use of a secondary clutch of the jaw type within the gearbox itself by which the gearset is completely disconnected from the propeller shaft. The driver makes all gear changes by giving a slight motion to a wheel or lever on the steering post, as a result of which the rear or secondary clutch is automatically operated and the gears are shifted while relieved from load and positive drive. Because the gearset is thus unloaded at both ends by the usual power transmitting clutch and by the secondary clutch in the gearbox, it is possible to shift from any gear to any other gear desired, either forward or back, without the use of brake or accelerator. It is claimed that any desired shift can be made instantly, irrespective of roads, loads, grade and brake conditions, speed of engine, car speed and direction.

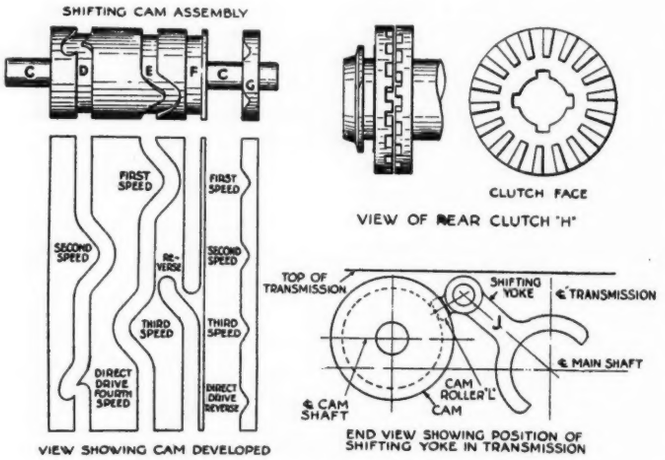
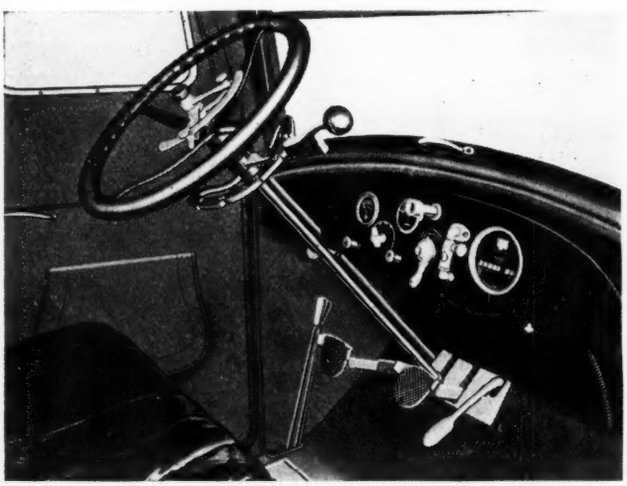


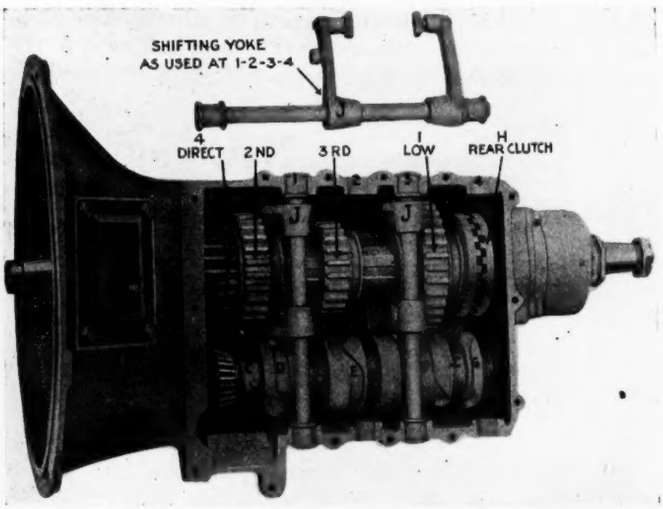
Fig. 1—Details of Flexo transmission gearset, whose operation is described in text.

The gearshifting means also operates the secondary clutch. The device consists of a rotary camshaft, which is so timed that the gears do not begin to shift until the rear or secondary clutch is entirely disengaged. After the gears are completely meshed, the rear clutch automatically re-engages. The device, therefore, is positive in operation.

One of the important advantages claimed for the Flexo transmission gearset is better control of the gear or truck on steep grades or on slippery roads, because of the possibility of using the engine for a brake through the lower gears. With the usual sliding, selective transmission it is difficult to shift down from the higher to the lower gears. With the Flexo gearset, because of the unloading feature, it is possible to make this down shift just as readily as an upshift, and by



Peerless car equipped with Flexo transmission showing lever on steering column for gear shifting.



Assembly of the Flexo transmission showing details of parts.

using the engine as a brake, the tendency to skid on slippery roads is overcome. It is also claimed that the use of the device makes it possible to shift gear more quickly and hence with less loss of car momentum.

In making a shift to a lower gear when climbing a hill, it is ordinarily necessary to first allow the speed of the car to decrease very noticeably. Expert drivers are able to make this down shift at high speeds by speeding up the engine before disengaging the clutch while the gearset is in neutral. However, this requires a degree of skill beyond that of the average driver. With the Flexo transmission, by the use of the secondary clutch, the change down is made while the gears are stationary and unloaded, and consequently no clash is experienced.

This transmission is provided in a three-speed type, and also in types with from four to seven speeds. It is claimed that with the greater number of speed changes a smaller engine can be used and operated within a small speed range. The seven-speed transmission is particularly recommended for trucks.

Referring to Fig. 1, the operation of the transmission is apparent. By means of the hand wheel or lever on the steering post, a rotary motion is given to the camshaft C. On this shaft there are three slots, D, E, and F, which actuate the gear-shifting yokes J, J, J, and a face cam G. As shaft C is rotated, the yoke operated by cam G disengages the rear clutch H, thus completely disconnecting the transmission shaft from the rear drive shaft. As the camshaft C continues to rotate the particular set of gears corresponding to the speed desired is moved into mesh.

Cam G is so timed in relation to slots D, E and F that the rear clutch H re-engages after the gears are completely meshed.

The transmission is known as the Flexo and is manufactured by the Flexo-Motive Corporation.

Some New Automobile Accessories

An Eccentric Type Bonnet Lock

A NEW engine bonnet lock of the eccentric type, herewith illustrated, is claimed to permit of the use of a much stronger spring than is used on the present type of lock and still be readily operated with one finger. The eccentric locking element is associated with the bonnet catch in such a way that a two-point bearing of the same is secured, the intention being to prevent rattling and side motion of the bonnet.

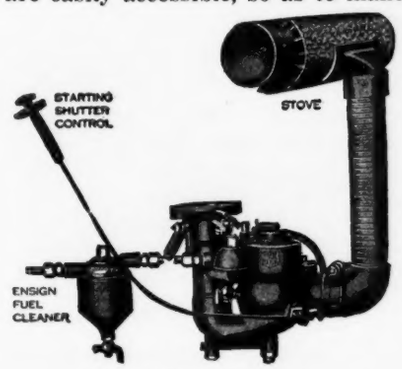
The bonnet lock is adjusted by rotating the body on the anchor bolt. This lengthens or shortens the lock, as desired. Each time the lock is released the anchor bolt is automatically forced into engagement with an absorbent oil saturated pad, contained within the lock body. This lubricates all moving parts.

All exposed parts of this lock are made of brass and nickel-plated. This lock is made in two styles, one with coiled spring and the other without. The anchor bolt is threaded down into the body, giving an adjustment of 1 in., to permit of holding the bonnet down with any desired tension. The lock is manufactured by the Ideal Brass Works.

New Carburetor Model

A NEW carburetor, known as Model E, having manual starting control and new idling adjustment, is announced by The Ensign Carburetor Co. The metering and mixing principles peculiar to the Ensign design are retained, but the adjustments are placed on the top of the carburetor where they are easily accessible, so as to make installation and adjustment as convenient and simple as possible.

The closing of the starting shutter (pulling out the choke, as it is known to most motorists) creates a greater whirling action in the mixing chamber, in proportion to the amount the shutter is closed, even at slow engine speeds. This imparts a higher velocity to the charge and thus more thoroughly breaks up and atomizes the mixture even at starting speeds.



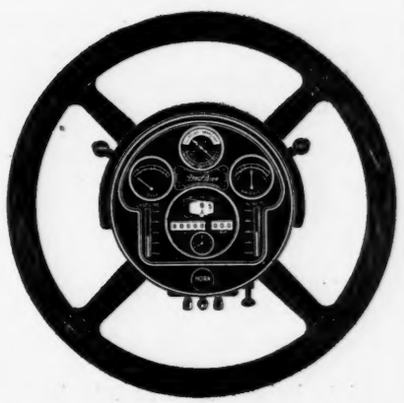
New Model of Ensign Carburetor

Eccentric type bonnet lock

Clearing the Instrument Board

AN instrument board for installation on top of the steering wheel has been developed and is being manufactured by the Whyte-Duffield Mfg. Co. The speedometer, oil gage, ammeter, ignition and lamp switches and any other indicating mechanism normally used in car operation may be mounted upon it, leaving the space ordinarily used for the instrument board and its connections free for storage compartments for gauntlets, lamp bulbs, spark plugs, curtains or any of the numerous other things that motorists like to carry on the car in a handy place. The control board is flush with the steering wheel, and all of the indicating devices are directly in the line of vision of the driver, which is certainly a convenience.

The Whyte-Duffield Mfg. Co. plans to furnish anufacturers with the wheel and post as a complete unit, fully wired, ready for installation. The design is said to possess advantages from the standpoints of both the manufacturer and the repairman.



A Steering Wheel Instrument Board

Tractor Tests Under New Rules Insure Comprehensive Results

The rules of the Fargo tractor demonstration, to be held next week, require that each tractor and horse outfit plow a 10-acre plot. Results will record the average performance of all the tractors. Factors considered will include fuel, lubricating oil and water consumed, stops, repairs, etc.

RULES for the series of three farm tractor demonstrations to be held during the present season have been issued by the National Implement & Vehicle Association's demonstration and show committee. The first is to be held at Fargo, N. D., June 28, 29 and 30. Tractors and horses are to meet in the demonstrations, which are intended primarily to arrive at some accurate figures of farm cultivation with either horse or tractor in order to counteract the mass of misleading information on this subject that has been in circulation for so long a time.

The rules are immeasurably superior to any previously used by the N. I. V. A. in its demonstrations. First, each tractor or horse outfit has a 10-acre lot that has to be plowed, disked and otherwise prepared for seeding. This is the first time that each tractor has been given so comprehensive a test. It will take a three-plow tractor approximately 10 or 12 hours to plow such a tract, which means a full day's work, which is much more of a test than the hour or so that each tractor has had to spend in plowing in the past.

Second, while at its work of plowing, preparing the seed bed and sowing the seed there will be two observers watching each tractor. One is to keep record of the tractor, including such matters as time, fuel, oil, feed, water, labor and other expenses, and the other observer will watch the work done, checking depth of plowing, contour of furrow, width of plowing and any irregularities in the work.

The observers will be appointed by the tractor makers competing and will follow the traditional contest rule of not observing on the make of tractor that they are employed with. These observers will have report cards on which all observations will be noted. It is the first time that observers have been used in connection with tractor tests conducted by the N. I. V. A., although they have been used in tests conducted by different state authorities.

The demonstrations are to be open to tractors of all sizes and to plow outfits consisting of any number of plows and each tractor has to cultivate completely a 10-acre tract irrespective of the number of plows it pulls. A tractor pulling eight plows has no more land to cultivate than one pulling two plows or one plow. This seems to be the unfair character of the test as naturally a two-plow tractor will be working nearly four times as many hours as a tractor pulling eight plows. The small tractor has four times the possibility of mechanical troubles and in reality gets four times as long a test.

This is the first N. I. V. A. demonstration in which a complete record is to be made not only of the fuel consumed by each tractor but also the lubricating oil consumed and also the water consumed in the radiator, in the air washer and in being fed direct to the cylinders through the fuel. A record will be kept of all tractor stops, and in making necessary repairs on the tractor no one will be permitted to perform the work except the driver under penalty of disqualification, and he is only permitted 30 minutes at any one stop for a repair. A stop in excess of this brings disqualification. Tractors are to be limited in speed to that at which they do good work, disqualification being the penalty for traveling too fast for satisfactory work.

The tractors will be required to begin plowing at 8 a. m. opening day and with an hour out for lunch will work continuously until 7 p. m. and on the second and third days will start at 7 a. m. and with an hour for lunch continue until 7 p. m. This will give the tractors a real test and give spectators a real opportunity to observe the different machines. It is just such a demonstration as this that has been needed for many years.

The findings and results of the demonstration are to be of a collective or group character rather than with regard to individual tractors. No tractor will be a winner in the two-plow, three-plow or any other class, but the results of all tractors qualifying are to be averaged and will show what it costs to plow, cultivate and seed a 10-acre tract by tractor and what it costs to do the same work by horses.

In arriving at these results what is known as a supervisor's committee has been appointed which will take the cards made out by the observers and make the necessary calculations from these. These calculations will be made for all of the tractors, and they will be totalled and averaged so that if 60 different models of tractors competed the cost of the work will represent the average of these sixty and not the cost of any one tractor, or any class of tractors, the object aimed at in the test being to give figures on costs that should be reliable. The average costs for the horse outfits will be similarly arrived at.

These results as obtained by the supervisor's committee will have to be referred to the demonstration and show committee of the N. I. V. A., which is the final authority and which approves of all results before they are given out and which also rules finally on all questions regarding the rules and questions arising out of them.

The individual tractor manufacturers are not to be permitted to publish the performance of their tractors until after Oct. 1, 1921. The time required by any tractor to plow, cultivate and seed its 10-acre plot will remain a secret until that time, the apparent reason being that two other demonstrations are to be made and no individual results can be published until the series of three tests is complete.

In publishing the results of each tractor test three figures will be given out: First, one cost figure that will give the average cost for the work of all the tractors.

Second, in order to get figures that will be fairer to these tractors that are better than the average, there will be averaged all those tractors that have performed better than the average of the first or total group. In short this means an average of the best half of all tractors competing.

Third: In order to get figures showing the best that tractors can do the performance of the best six will be taken and averaged and this figure given out.

In all three of these cost figures no mention will be made of individual tractors performances and not until after Oct. 1 will the different tractor makers be permitted to make use of the actual records of their machines.

Tractors will be permitted to use any fuel, such as gasoline, kerosene or distillate, but there shall only be one grade of each and this shall be used by all competitors using such fuel. This eliminates the possibility of any tractor using a superior grade of any particular fuel.

In view of the character of representation in this supervising observers committee it seems unfortunate that the N. I. V. A. demonstration and show committee does not let the findings of such an impartial committee be final. The world at large would acccept the findings of such a committee quicker than findings which are approved by a committee representing those tractor makers competing in the demonstrations. The results would carry greater weight and be of more value to the tractor industry if the findings of the supervisors committee were final. The results would then be free from all trade influence. As a great contest take the annual 500-mile Indianapolis speedway race in which the contestants have no say in the findings, but such rest entirely with a disinterested contest committee, made up of men in no wise associated with any of the manufacturers of competing cars, or even with concerns manufacturing parts entering into competing cars or accessories used on cars.

Entries for the Fargo demonstration closed June 21 for tractors competing in the demonstrations, but for those to be exhibited at belt work entries close June 27.

A large accessory exhibit tent is to be used for display purposes, the rent for space in such being $1.25 per sq. ft. An entry fee of $100 is made for tractors; $50 for garden tractors, and $50 for cultivators. Fees are charged for tractors for belt work as well as other for exhibit purposes only.

A New Canadian Truck

A NEWCOMER in the Canadian truck field is the G. & J. truck. This truck has been designed particularly to meet the conditions typical of Canadian transportation and has been under test for about 14 months.

Production of the 2-ton model began on a small scale in the fall of 1920. The designs of the 3½-ton model were put on exhibition at the Windsor, Ont., show in the latter part of February, and this model is now also in production.

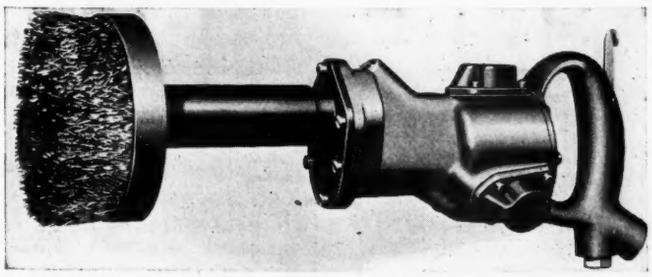
It is also purposed to bring out a light, 1-ton model, and eventually a 5-ton model. The specifications of the 3½-ton G. & J. truck, which is the latest model to be put in production, are typical of the entire line, except the 1-ton, which will be different in every respect, but on which information is not now available. The Hinkley Class B truck type engine in conjunction with the conventional, worm drive, Timken-Detroit axle, gives a foundation for the design of the truck. The engine is 4½ x 5½ in. and develops 50 hp. on the brake.

The other units in the truck include the Brown-Lipe transmission with four speeds mounted amidship on frame cross-members with provisions for a tire pump and power take-off. This transmission is mounted on Timken roller bearings and employs nickel steel gears throughout. Spicer propeller shafts with enclosed universal joints are employed, providing a straight line drive from the engine to the rear axle. The frame is rolled channel steel, hot riveted and reinforced with gussets. The depth of the channel is 7 in. and the width of the frame 38 in. The height from the ground to the top of the frame is 35 in. under average load. The road clearance under the front axle is 9½ in. and under the rear axle 9 in. The front wheel tread is 66½ in. and the rear wheel tread 65¾ in. The overall length is 245 in. and the width over the rear hubs is 86¼ in. Other specifications are as follows: Cooling by centrifugal pump and McCord finned tube radiator. Vacuum fuel feed to Stromberg carbureter. Bosch magneto with impulse starter. Dry plate clutch. Chrome vanadium springs. Gear reduction 10.3 to 1 on high, 55.2 to 1 on low. Ross steering gear. Chassis weight 7000 lb. Wheelbase 160 in.

The truck is made by the Gotfredson Joyce Corp, Ltd.

Wire Brush Cleaner

WIRE brush cleaning of metal surfaces offers an opportunity for considerable saving of time and labor over that required by hand in removing paint, rust, scale and dirt. It has been difficult, however, to obtain a wire brush of proper design and materials which would work effectively on an air motor and not wear out too rapidly.



Ingersoll-Rand air driven brush.

A wire brush of very rugged design has recently been placed on the market by the Ingersoll-Rand Company for use with its standard No. 6 "Little David" Drill. It is a brush with face diameter of 5 inches and is made up of wires of a special heat-treated steel.

It is manufactured particularly as an attachment for the No. 6 Drill (as illustrated), this type of machine being especially suited for work of this nature. The whole outfit weighs only 11½ pounds.

The wire brush outfit is adapted for removing paint, rust, scale and dirt from tanks, steel cars, structural steel and all sheet metal surfaces. It is very useful for cleaning iron, steel and aluminum castings.

Intake Manifold Practice in Europe

Poor economy results are frequently due to faulty manifold design. Fuel quality affects manifold performance greatly and renders difficult the designing of a manifold which will be satisfactory under all conditions. Past and present intake manifold practice is discussed in detail here.

By W. F. Bradley and S. Gerster

SPEAKING generally, insufficient attention has been given in the automobile industry to the design and construction of intake manifolds, and it is because of errors in this particular feature that many modern engines give poor economy results. Where mistakes have been made in the layout of the intake manifold, it is useless to attempt to discover a complete remedy by the use of a more modern or more efficient carbureter.

It is not at all an easy matter to lay out a manifold which will give satisfactory results under all operating circumstances and with different qualities of fuel. If high grade gasoline could always be assured, the task of laying out a manifold which would operate satisfactorily under the wide range of temperature conditions of winter and summer, would not be very great.

With the heavy and poorly refined gases now commonly employed in America, the problem of designing an efficient manifold and a good carbureter is accentuated, and the inconveniences of these low grade fuels soon show themselves in carbonized combustion chambers, dirty valves and plugs, crankcase dilution, etc.

With light, well refined gas there is less necessity for preliminary heating of the mixture, and an increased volume of gas can be introduced into the cylinders. With heavier gasoline, with benzol, and with kerosene, the manifold should be a part of the carbureter, and the mixture should be well heated from the time it leaves the carbureter until it passes through the valves into the combustion chamber. It is even advisable, when using kerosene and benzol, to heat the fuel in the carbureter, and before it passes through the jet. In the case of napthaline the whole appliance must be heated in order first of all to liquify the fuel and then to vaporize it.

THIS article, by Automotive Industries' French correspondent and a well-known French consulting engineer, is based mainly on French practice. The gasoline sold in France to-day contains less of the heavy fractions of petroleum than does the motor fuel sold in this country. This may explain some of the recommendations made in the article, notably the insistence upon the importance of water-jacketing of the manifold and the slight reference to exhaust jacketing.—Editor.

Experience has shown that gas velocity V_g

$$V_g = \frac{S' \times V_p}{f}$$

should be between 60 and 70 meters (196 and 230 feet) per second at the carbureter outlet. In the above formula S' represents the surface of the piston, V_p the piston velocity and f the section of the gas passage. Variations in the gas velocity occur according to the length and shape of the pipe, it generally being admitted that the velocity at the valve ports should be from 56 to 62 meters (183 to 203 feet) per second.

Intake Pipe

There is every advantage, in a single cylinder engine, to have the intake pipe as short as possible. In a four-cycle engine gas admission takes place once, and during

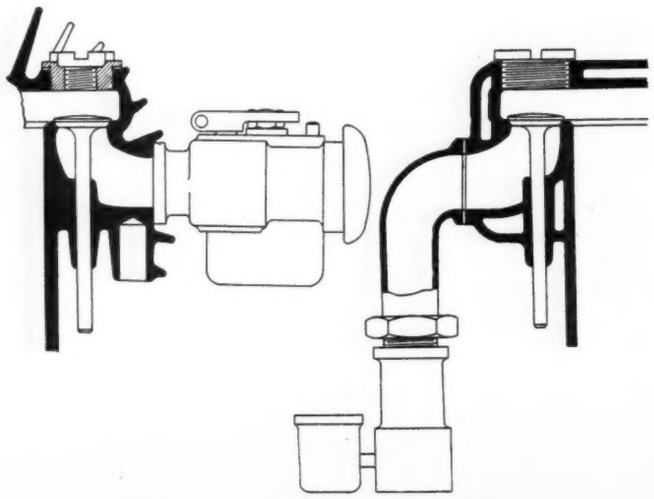


Fig. 1

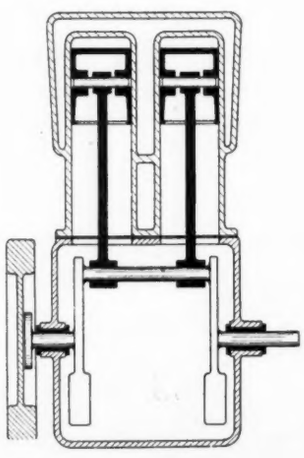


Fig. 2

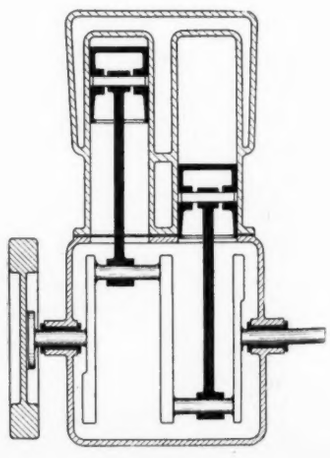


Fig. 3

Fig. 4

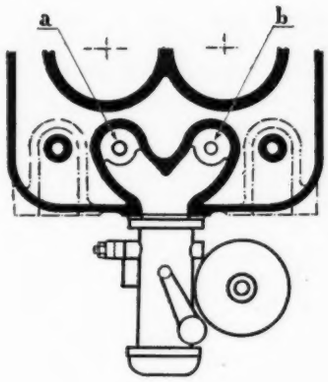


Fig. 5

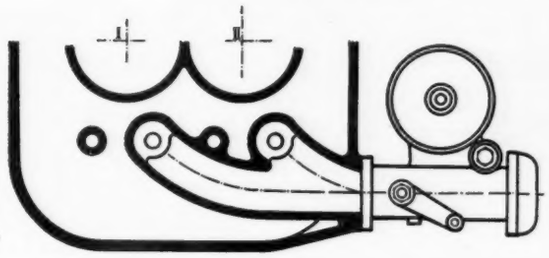


Fig. 6

a half revolution of the shaft, for two revolutions of the engine. In other words, during three-quarters of the time parts of the manifold are filled with gases which have been arrested by the closed valve. The greater the volume of gas, the greater the condensation, and this condensed gas is admitted into the cylinder without being mixed with air, and naturally burns badly. It is in order to avoid this that the intake pipe should be made as short as possible, or even better, the carbureter should be bolted up direct to the cylinder, as shown in Fig. 1.

When only vertical carbureters were in use the problem was rather different, for in order that the mixture be formed it was necessary to have a curved pipe from the carbureter to the intake port (Fig. 2) and it was advisable that the curve be made as easy as possible. A much higher efficiency is obtainable with the arrangement shown in Fig. 1 than with Fig. 2.

Fig. 7

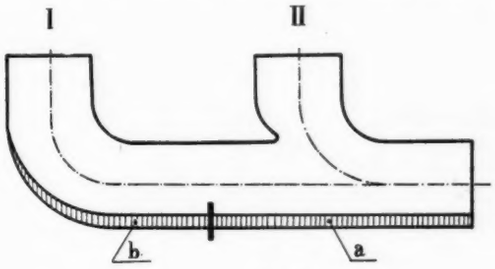


Fig. 8

Twin Cylinder Vertical Engine Practice

For twin cylinder vertical engines the type of manifold varies according to whether the throws are at 360 degrees (Fig. 3) or at 180 degrees (Fig. 4). With throws at 360 degrees the manifold should be laid out according to Fig. 5, (a) being the valve of the first cylinder, and (b) the valve of the second cylinder. It is advantageous to have an internal intake manifold, surrounded by the circulating water, the heat thus obtained being sufficient to maintain the gases at a sufficient temperature to prevent condensation. On some engines with thermo-syphon water circulation and inclined to run rather hot, this heating may be excessive in summer but in winter it gives every advantage.

The manifold of a two-cylinder engine with throws at 180 degrees, as shown in Fig. 4, should not be dealt with in the same way, for there are not the same intervals between the two aspirations as in an engine with cranks at 360 degrees. The length of time during which the gases remain still in the intake manifold is not the same for the two cylinders, and, in consequence, there is condensation for the cylinder which aspires after the interval, while the second cylinder, aspiring immediately after the first, is not affected by condensation. Fig. 6 shows a suitable type of manifold for an engine of this class, and Fig. 7 is the camshaft with the order of gas admission.

In this case cylinder 2 is the first to aspire, cylinder 1 coming immediately after it. During two revolutions of the engine the carbureter supplies a mixture to the succeeding cylinders at intervals of a half revolution, and during the rest of the cycle it is inactive.

During this revolution there is partial condensation of the mixture remaining in the intake manifold, and this condensed gasoline is drawn into the cylinder which is the first to aspire after the interval. If the manifold is laid out according to Fig. 5, the first cylinder to aspire after the interval will have a rich mixture. If the manifold is according to Figs. 6 and 8, either one cylinder will have a richer mixture than the other, or the two will have the same mixture, according to the order in which they aspire. If cylinder 1, Fig. 8, takes the first aspiration, it will receive the gasoline condensed at points *a* and *b*, while cylinder 2, aspiring immediately afterwards, will get no condensed gasoline, and consequently will have a weaker mixture. On the other hand, if cylinder 2, on Figs. 7 and 8, is the first to aspire, it will only take up the gasoline condensed at points *a*, while the liquid fuel at *b* will be drawn into cylinder 1.

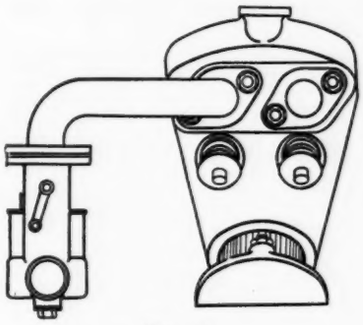


Fig. 10

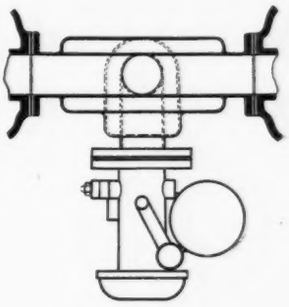


Fig. 11

This, therefore, should form the basis of the firing order for engines of this type, as well as for four, six and eight cylinders in line with one or several carbureters. This matter can readily be controlled on an engine with an external unheated manifold, when it will be found that the two cylinders will stand quite a different carbureter

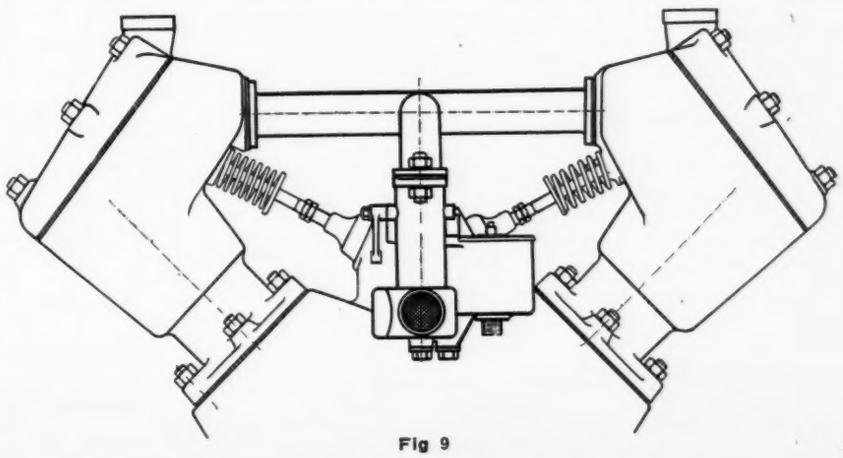


Fig 9

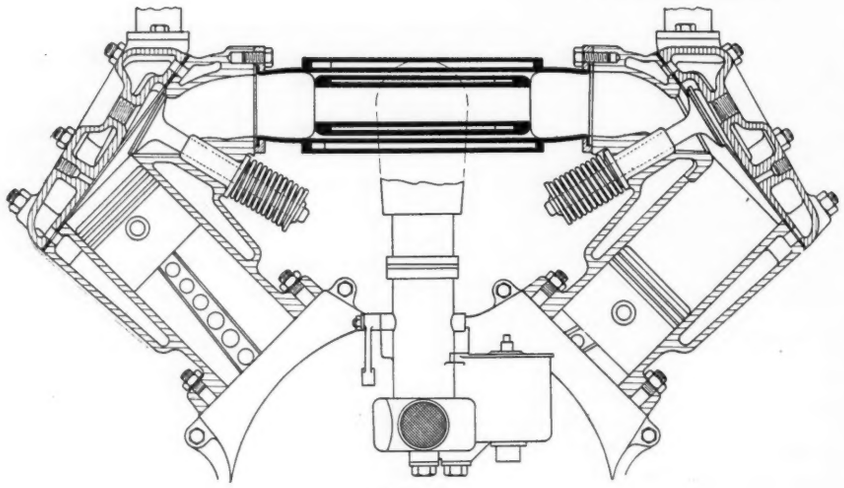


Fig. 12

setting than would be required under other conditions.

When the whole of the intake manifold is inside the water jacket there is much less tendency for gasoline to condense and little trouble is experienced in this connection. Twin cylinder V-type engines, with carbureter and intake manifold mounted as in Figs. 9 and 10, are particularly susceptible to the defects mentioned above, and various devices are adopted to overcome these, without complete success, however.

With an intake manifold as shown in Fig. 11, the same defects are encountered as in twin cylinder vertical engines at 180 degrees, shown in Fig. 4, with the intake manifold of Fig. 5. Some improvement is obtained by water jacketing the manifold, as shown in Fig. 11, or by having a fairly long vertical branch, as indicated in Figs. 9 and 10. Another type of manifold is shown in Fig. 12, where an internal tube balances the two columns of gas and prevents condensation.

Old Types

Many old type four-cylinder engines still in use have very defective manifolds. An example of this is given in Fig. 13, where the long unheated pipe above the carbureter tends towards excessive condensation, and the pocket above the valves completely upsets the mixture. With an intake manifold of this type it is impossible to get slow running, and starting in winter is always difficult, for there is insufficient gas velocity to carry along the liquid fuel deposited in the pipe. Another old type, but still in use on some cars, is shown in Fig. 14. This has many defects, notable among them being the point (*b*) where fuel condenses, making starting and slow running difficult.

With a manifold of this type an improvement is obtained by the device shown in Fig. 15. The large diameter tube *a* carries air only, the rich mixture being taken through the small diameter tube *c* as far as the point where the branches are formed for the different valve ports. In addition to this, the part *d*, where there would normally be a tendency for fuel to condense, is heated by the water jacket.

Very few, if any, engines are now built with external carbureter on the opposite side to the valves, for better results can be obtained, by reason of the shorter pipes, with the carbureter on the valve side of the engine.

The manifold indicated in Fig. 16 has all the inconveniences of the unheated external manifold for twin cylinder engines shown in Fig. 5, for one of the cylinders in each group is always more richly supplied than the other. Fig. 17 gives a type of intake manifold suitable for an engine with separate cylinders.

Firing order should be 2-1-3-4, in accordance with the theory illustrated in Fig. 8. In this way cylinder (1) can receive gas of the same richness as cylinder (2), and the same applies to cylinders 4 and 3. With the lay out shown in Fig. 16 this is impossible.

The adoption of block cast cylinders has contributed considerably to the improvement of intake manifolds. For-

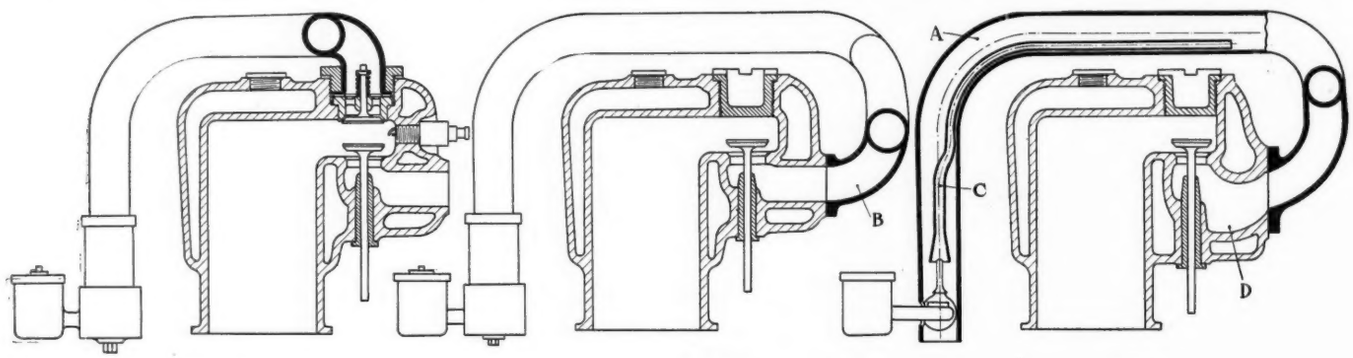


Fig. 13 Fig. 14 Fig. 15

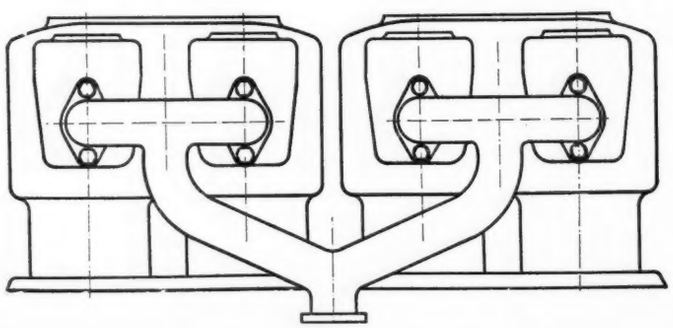


Fig. 16

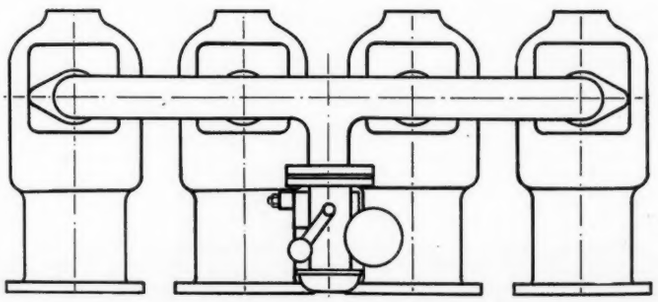


Fig. 17

merly the heating was secured by a by-pass from the circulating water, with pipes of small diameter which were liable to become choked, or with hot muffs from the exhaust, which gave too much heat and frequently failed to operate satisfactorily.

Since the introduction of internal manifolds surrounded by the circulating water the efficiency of automobile engines has been considerably improved. Figs. 18 and 19 show an internal water heated manifold placed externally to the valves. This should be compared with the more satisfactory layout illustrated in Figs. 20, 21, and 22. The manifold in Figs. 20 and 21 is designed for a gas velocity at the carbureter mouth of 230 feet per second, of 220 feet per second at the point *b*, and 210 feet in the valve ports. It will be noticed that the carbureter is placed at the lowest point and the gas takes an upward direction during the whole of its course, so that any particles which may be condensed will be carried along with regularity. Particularly for cold weather service this is a most satisfactory manifold, for the mixture is maintained at a reasonable temperature while in formation and until it passes into the cylinders. The manifold shown in Fig. 22 is certainly an improvement on the preceding one, for the length of the gas passages is reduced.

In order to secure successful and economical operation, the intake manifold should be of uniform diameter and have no sharp bends, and particularly no right angle bends at the valve ports such as are shown in Fig. 13. Sudden variations in the diameter of the gas passage cause expansion of the gases and provoke condensation. A manifold design which has proved satisfactory for overhead valve engines is shown in Figs. 23 and 24.

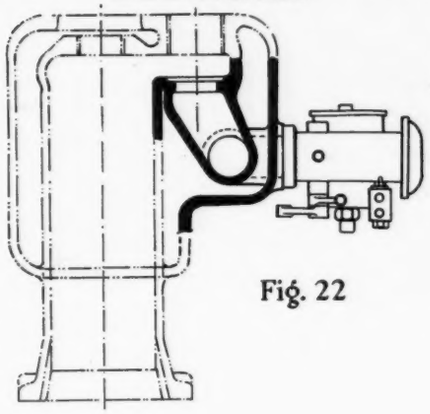


Fig. 22

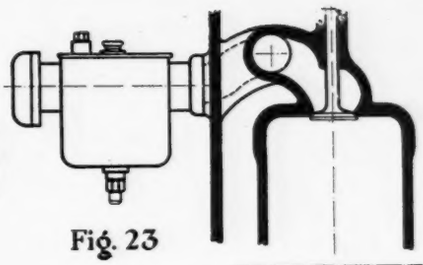


Fig. 23

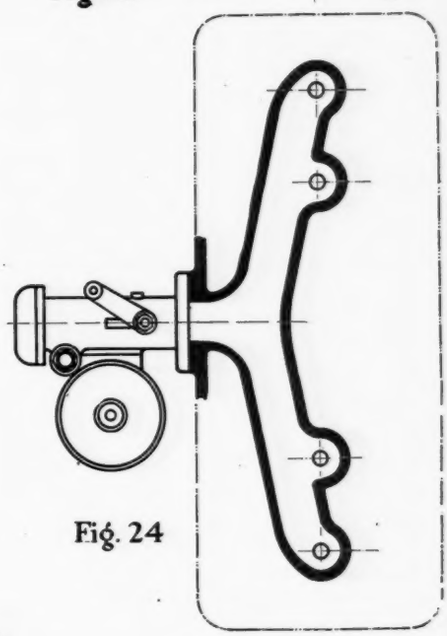


Fig. 24

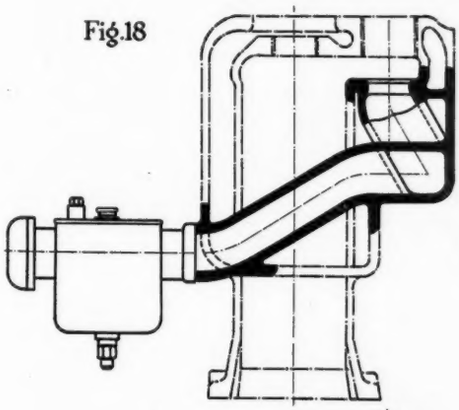


Fig.18

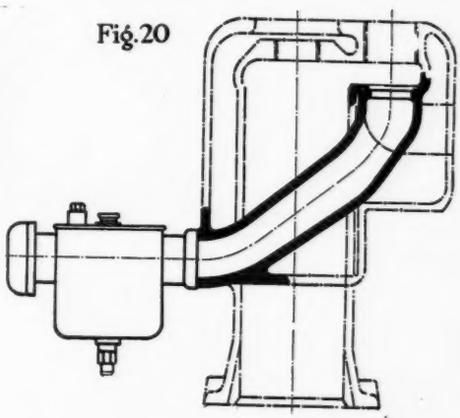


Fig.20

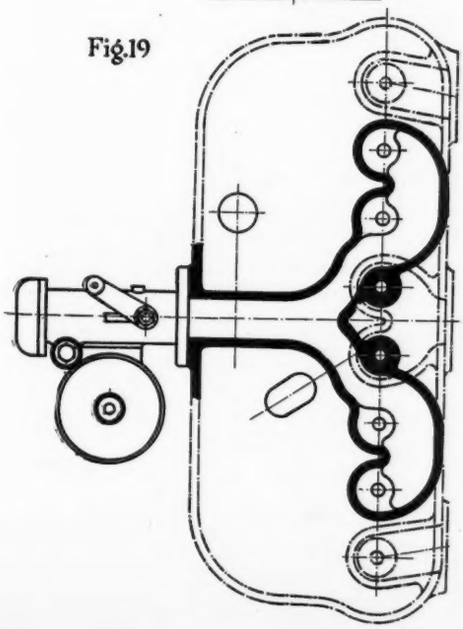


Fig.19

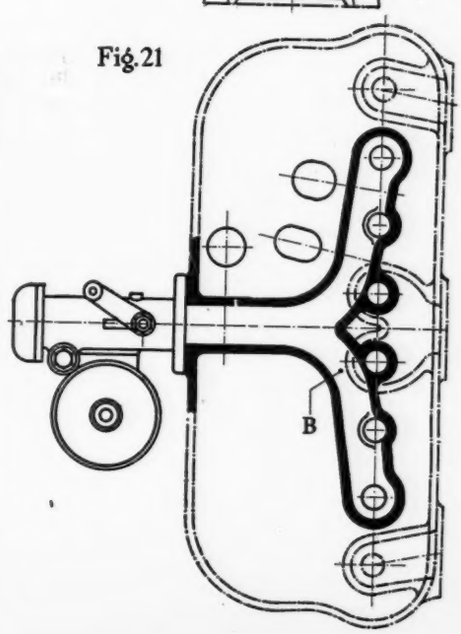


Fig.21

Six-Cylinder Motor Manifolds

Intake manifolds for six-cylinder motors differ in principle according to the layout of the crankshaft. The two arrangements shown in Figs. 25 and 26 are common practice. The firing order for a crankshaft of the type shown in Fig. 25 can be 1-3-5-6-4-2, or 1-4-2-6-3-5. For the crankshaft shown in Fig. 26 the firing orders are either 1-5-3-6-2-4 or 1-2-4-6-5-3. The order most commonly adopted by European manufacturers is 1-5-3-6-2-4, shown in Fig. 26 followed by the order 1-3-5-6-4-2 indicated in Fig. 25.

In deciding the firing order of the cylinders it is necessary not only to take into consideration the question of the intake manifold, but also the working conditions of the crankshaft. In laying out the order

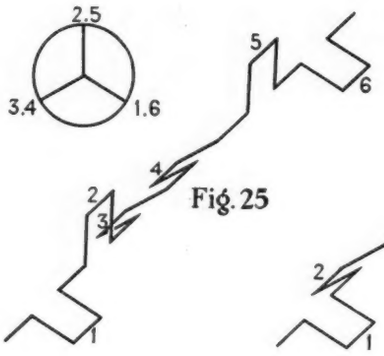


Fig. 25

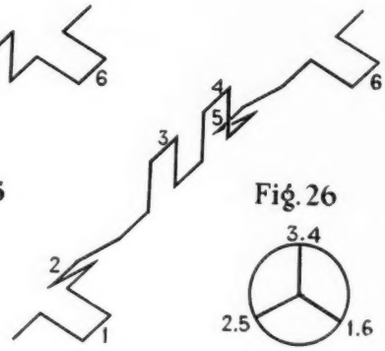


Fig. 26

in which the aspirations shall take place, the principles of condensation of fuel which have been explained in connection with twin cylinder engines at 180 degrees should be kept in mind.

The use is fairly common among European manufacturers of six-cylinder engines of two carbureters, one for each group of three cylinders, these two carbureters either being entirely distinct or having a common float chamber.

Experience has shown that with an external manifold having insufficient heating it is very difficult to avoid slight variations in the composition of the mixture from cylinder to cylinder. The manifolds shown in Figs. 27 and 28, for instance, cannot give good results, for these long pipes cause condensation, and the liquid fuel is always aspired by the same cylinder, which becomes choked with gasoline. Fig. 29 is another defective arrangement, by reason of its two long, unheated branches.

Satisfactory results can be obtained from the manifold shown in Fig. 30, if the firing order is 1-5-3-6-2-4; the flow of gas changes in its direction at each aspiration, the cylinders 3 and 4 then 2 and 5 being fed with the greater facility. This arrangement has been adopted by Delage for his overhead valve sporting type car with external manifold.

Another Firing Arrangement

When the firing order is 1-3-5-6-4-2, the arrangements of intake manifold most commonly adopted are those shown in Figs. 31 and 32, both of which are satisfactory, for they give practically equal lengths of pipe for cylinders 2, 3, 4 and 5. There is a greater length for cylinders 1 and 6, but this does not appreciably affect their operation, for as they are followed by their neighboring cylinders 2 and 5, there is no change of direction of the gas in the manifold. This general arrangement is almost essential when a single carbureter is used. Fig. 33, although found on certain cars, has little to recommend it.

If two carbureters are employed it would be difficult to get a better arrangement than that shown on Fig. 34, which is the general layout adopted on the six-cylinder Hispano-Suiza, the only difference being that instead of two independent carbureters, a double type with a common float chamber is employed.

With six-cylinder engines having internal manifolds it is rather difficult to ascertain what variations are taking place in the supply of gas to the different cylinders, and only a certain notion can be obtained when starting up with the engine cold. For this type of engine two manifold arrangements are common, namely the one shown in Fig. 35 when the firing order is 1-4-2-6-3-5, and the one shown in Fig. 36 with the firing order 1-5-3-6-4-2. For small engines with comparatively small intake pipes, the operation is practically perfect with these two layouts, and it is impossible to detect any substantial varia-

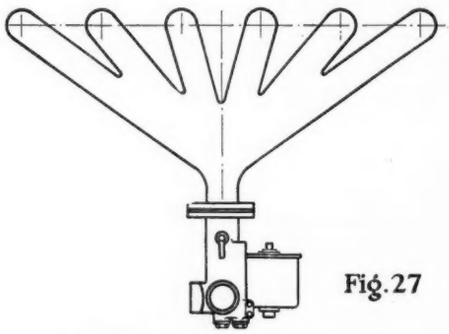


Fig. 27

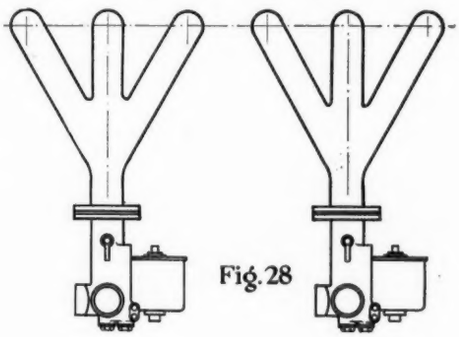


Fig. 28

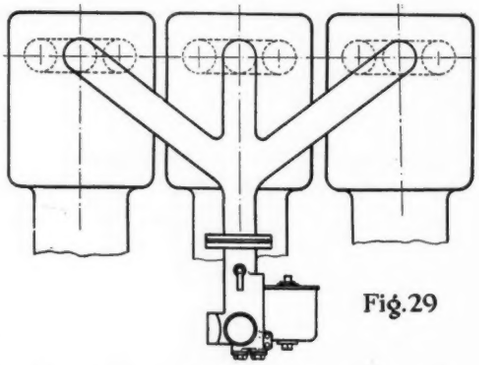


Fig. 29

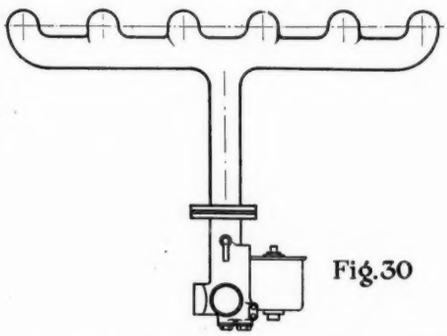


Fig. 30

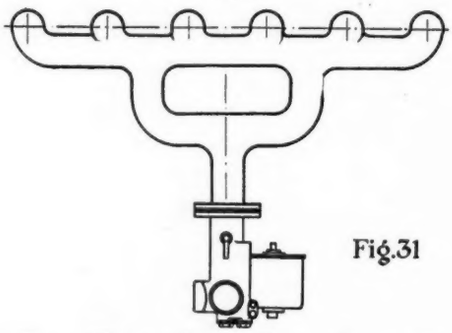


Fig. 31

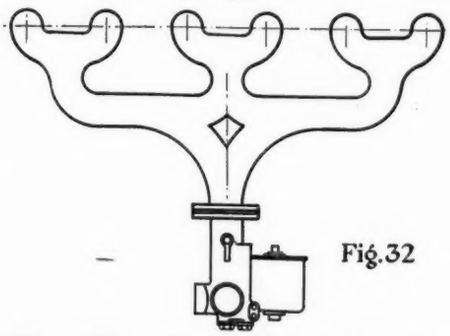


Fig. 32

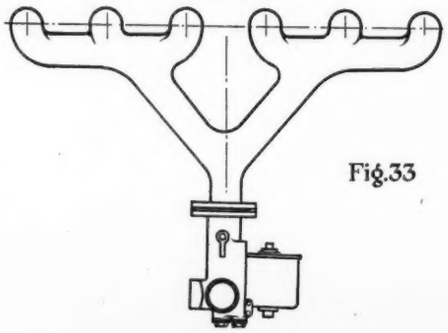


Fig. 33

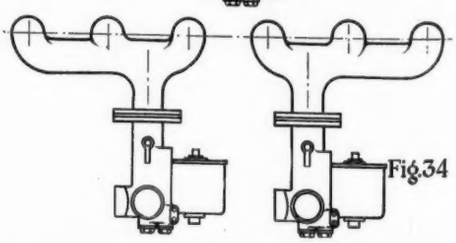


Fig. 34

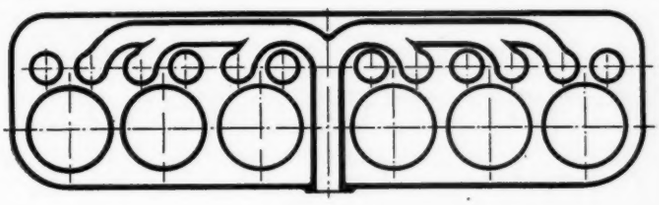


Fig. 35

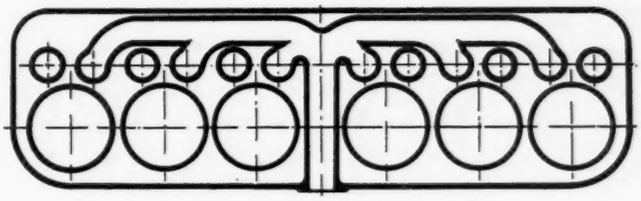


Fig. 36

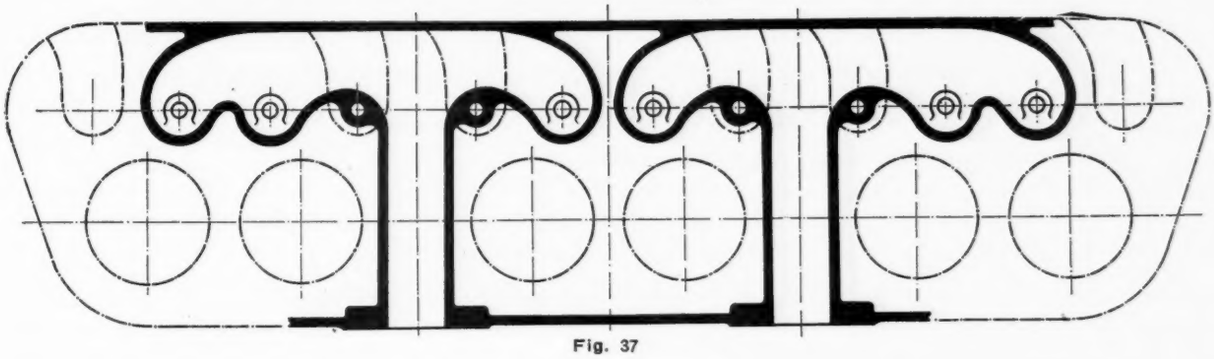


Fig. 37

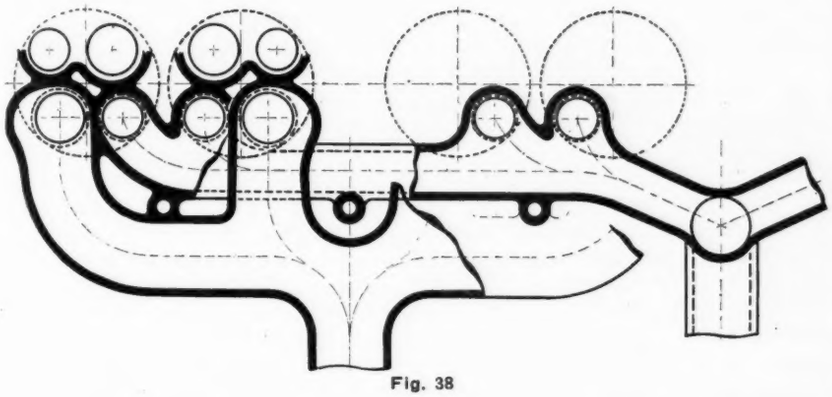


Fig. 38

tion in the mixture as between the different cylinders.

Six-cylinder engines with internal manifold and two carbureters can be laid out according to Fig. 37, when the firing order is 1-5-3-6-2-4. This particular layout is adopted by Delage for his stock six-cylinder model with internal manifold. Undoubtedly this arrangement is more satisfactory from an operating and efficiency standpoint than those shown in Figs. 35 and 36, but it is a more costly production job, by reason of the two carbureters and their combined throttle control. Theoretically a single carbureter is preferable, but practice has shown that better results are obtained with a carbureter for groups of three or four cylinders used on a multi-cylinder engine.

Eight-cylinder-in-line engines operate like two four-cylinder engines in line with the crankshafts at 90 degrees and with two carbureters. Generally the manifold of each group is laid out as for a four-cylinder engine. On certain high speed motors use has been made of three carbureters, a small one supplying the mixture for slow running, and two large ones coming into operation together with the small one, at high engine speeds. Fig. 38 shows this arrangement on a European eight-cylinder-in-line engine of 85 by 140 mm. In this engine each group of four cylinders is fitted with a 42 mm. carbureter which feeds through the big intake valves of each cylinder, while the small intake valves of the eight cylinders are fed from a single 36 mm. carbureter through a manifold uniting these eight valves.

It has not been possible to get really satisfactory results on eight-cylinder V engines with a single carbureter. Although it is reasonable to suppose that a single carbureter, as shown in Fig. 39, giving the quantity of gas required for the engine, should enable the same power to be obtained as with two single or one dual carbureter, tests have shown that the dual carbureter arrangement, as shown in Fig. 22, gives the better results.

It is not only necessary to consider gas velocities and the possibility of condensation in the gas passages, which upset the mixture, but account must be taken of changes of direction at the main fork above the carbureter. When the direction of gas flow is changed condensation takes place. As a consequence the mixture distributed to the different cylinders ceases to be uniform, and there are no reliable means of determining which cylinder or cylinders are being ill supplied. These defects can best be overcome by the use of one carbureter for each group of four cylinders, or by a dual carbureter. The preferable firing order is that shown in Fig. 41. The manifold should be water heated.

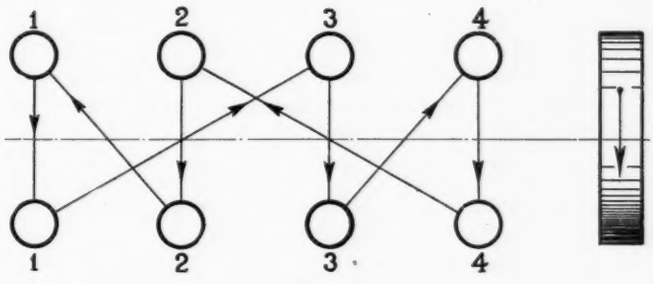


Fig. 41

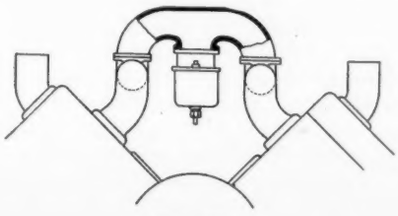


Fig. 39

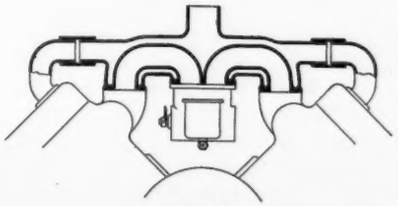


Fig. 40

Review of Engineering Features of British Motorcycles

Vickers, one of the best known British engineering firms, has entered the motorcycle field with a two-stroke V engine for the Enfield machine. Ladies models have been introduced by the manufacturers of several lightweight machines. America well represented in Olympia show.

By M. W. Bourdon

THE entrance of Vickers, the well-known engineering firm, into the motorcycle field and the appearance of several ladies' models comprise two important features of the recent British motorcycle show. Interesting engineering features appeared on a number of models, while changes in the method of lubricating two-stroke engines are common.

The Vickers entry thus far consists only of a twin-cylinder V engine for Enfield machines. Several other prominent British car manufacturers have also become interested in the motorcycle industry. Chief among these are Sunbeam, Humber and Rover, though these are all firms which graduated into the automobile industry from the manufacture of pedal cycles. The designers of their motorcycles are chiefly the men who were responsible also for their present pedal bicycles.

Several makers of lightweight machines have introduced a lady's model. The frame is not looped as in ladies' pedal cycles, but merely has the top tube inclined considerably so that it runs into the saddle tube about midway in the length of the latter. Motorcycling, not only on lightweights, but also on some of the heavier side-car machines, is becoming increasingly popular among women of all classes and of ages well into and often beyond the forties. A woman riding a man's machine occasions no remark, but while some makers, therefore, decline to standardize a special model, others believe that a wider field will be exploited by doing so.

Business in the British motorcycle industry was extremely slack during the two months preceding the November show at Olympia, but it has never for a moment been suggested that this has been due to the market having reached a state of saturation; it has been felt that orders were being held in abeyance for two reasons (1) an anticipation, or rather a hope, that a general reduction in prices would occur on the opening of the show, and (2) a doubt as to whether or not any radical changes in design would be in evidence in 1921 models. There has been no ground for either; prices have barely fluctuated, decreases and increases having occurred only in isolated cases, and even then have been small, while in the case of established makes variations in design have not been pronounced.

With certain exceptions, to be referred to later, the results of the past 12 months are, therefore, very disappointing from an engineering point of view. Improvements in detail were to be seen on almost every stand, but development in general has hardly occurred; in fact, there are not a few individuals, whose opinions are worthy of some respect, who maintain that development in certain directions has gone too far in the present-day motorcycle. The latter has been increased in power and speed and improved in suspension and equipment until, with a side-car attached, it has become as weighty and cumbersome as a light, two-seated, four-wheeled car, without the cleanliness of outline, ease of cleaning and protection of the occupants and power plant afforded by the latter. Further, in economy of running it provides little or no advantage over the miniature four-wheeler, which frequently covers 50 miles on an Imperial gallon of fuel, a consumption no more than equalled by some of the big side-car outfits. In speed and hill-climbing abilities only do the latter excel.

There were, however, at Olympia two machines which contain the germ of an idea for a new type of motorcycle for general purposes, a solo machine primarily, but one capable of carrying two passengers tandem fashion. At present the two machines in question are little better than glorified scooters, but though they differ very widely in constructional details, both contain the fundamentals of a practical type, with a screened engine, completely sprung frame of simple design, concealed controls and, generally, a motorcycle with many of the characteristics of a car. Further and detailed references to these machines and their possibilities of development occur later in this report. Meanwhile, dealing with the motorcycles as one found them at Olympia, a very pronounced tendency brought out by the show as a whole is the increasing popularity of lightweight machines, thus continuing a tendency which commenced about 1913. While there is no generally recognized definition of a lightweight motorcycle in Great Britain, it is usually assumed to be one having an engine of less than 15 cubic inches engine capacity, but, strictly speaking, this classification is misleading, for many machines of less than that capacity are outside the pale in weight.

Lightweights and Taxation

The popular type of lightweight is one weighing less than 200 lb., and there have been marked endeavors recently to lower the weight here and there so as to bring machines previously weighing over 200 lb. within that figure. These endeavors have been encouraged by the fact that on January 1 the new scale of automobile taxation comes into force, and in respect of motorcycles this will render machines under 200 lb. liable to an annual tax of $7.50, whereas machines over 200 lb. will be taxed $15. But the true lightweight machine is well within the maximum, and in its simplest form—namely, with a two-cycle engine of about 2½ hp., single speed belt drive and 24 x 2½-in. wheels—is less than 150 lb.

But while an increasing number of manufacturers are standardizing a lightweight model, none has discarded heavier and more powerful single- and twin-cylinder types. In fact, some have increased their range by adding a 6- to 8-h.p. model with twin-cylinder, 50-deg. Vee or horizontally opposed engine. For instance, Rudge has come out with a new Vee-engined model with all-chain drive.

There is a tendency to strengthen up some of the larger lightweights originally intended for solo work to make them suitable for light side-car attachments. It has been found that users of lightweights persist in fitting side-cars, so several makers have thought it advisable to recognize this fact and strengthen the frames to render them more suitable for passenger work.

Scooters and Motorized Bicycles

Although the motor scooter has not appealed to the public to an extent justifying the ambitious output plans of the number of firms who introduced them in 1919, it has had a certain vogue and was represented on five stands at Olympia. A seat is now general, but as a type no development has occurred, except in the cases already mentioned.

Motorized bicycles and pedal cycle motor outfits are in evidence. Of the former the J. E. S. has a stiffened frame, spring forks and a 1½-h.p. engine, both two-stroke and four-stroke types being used, the latter with superimposed valves. They have a direct belt drive to the back wheel with a jockey pulley for belt adjustment. In motor outfits, the Simplex unit has a 1-h.p., horizontal, two-stroke engine and a combined fuel and oil tank mounted as a unit on two pairs of tubular stays over the rear wheel, with a chain drive to a large sprocket secured either to the wheel spokes or rim. A single speed only is provided, with a hand-operated friction clutch within the driving sprocket.

Standardization Lacking

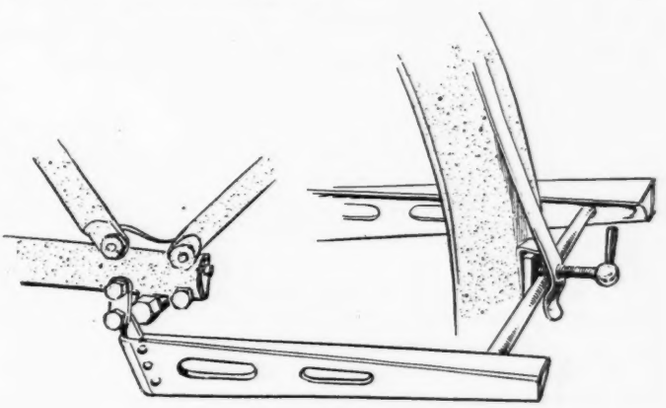
There is no evidence of real endeavor to reduce the production costs of any of the big range of types made by British firms, and there is no indication of any co-operation to standardize either frames or wheels, and no increased use of stock engines or gear-sets. The majority of firms make their own engines, only 38 per cent of the latter being stock jobs. Percentages are reversed in the case of gear-sets, and 55 per cent are of stock type. In four-stroke engines the most popular stock make is the J. A. P., which is supplied in many sizes; in two strokes the Villiers is favored. Of gear-sets, Sturmey Archer supplies 80 per cent of those that are not made by the motorcycle manufacturer. Spring front forks are frequently stock designs, but no other main detail is standardized. Frame design is still very involved and costly; no development in pressed steel frames has occurred since the introduction of the Pullin, described in AUTOMOTIVE INDUSTRIES last summer. There are three or four firms who specialize in the production of frames; but the latter are not stock jobs; they are made by these specialists to the design of small assemblers, each of whom has his own ideas concerning shape, size and general lay-out.

Rear springing for frames is developing very slowly, and designs are usually distinctly complicated and costly to produce. There is no observable endeavor to cope with heavier fuels, and a large proportion of standard machines, even new models, have no provision for heating either the air or the carbureter, except the proximity of the latter to the cylinders. Brakes are improving slowly, but there is still plenty of scope for further development; the same applies to the mudguarding of the smaller solo machines, though in the larger types and in side-car outfits guards run up to 8 in. in width.

Flexible Side-car Attachments

In side-car design there is very little development to report as compared with twelve months ago. There is, however, a tendency to provide a flexible coupling between the cycle frame and side-car chassis in order to prevent broken frame tubes owing to the stresses imposed through the side-car chassis from its wheel. This aim is attained by Beardmore by connecting the side-car axle to the frame through the medium of a short, laterally arranged laminated spring which displaces a section of the usual steel tube; upon the axle the body is mounted with Cee springs, intervening in the usual way, the front part of the body being spring mounted on the rigidly supported chassis. Two-seated side-cars (tandem or side-by-side seats) are now rarities.

Side-car taxicabs are now running in three British towns, Birmingham, Nottingham and Glasgow; the standard side-car machine is used usually with an 8-h.p. Vee twin engine, but a special two-seated body is fitted with a sedan or folding top.



Pressed steel rear stand of Beardmore machine

No maker has yet standardized electric lighting, but practically all of those producing machines over 3 h.p. and several of those making smaller types are prepared to fit a dynamo lighting equipment at an extra charge. When electric lighting is used a combined magneto and dynamo is becoming popular, two of the most widely used outfits being the Lucas Magdymo, which has two armatures, and the M-L Maglita, which has one armature generating the lighting current and a stationary ignition coil in the magnetic circuit.

An addition has been made to the names of important engineering firms associating themselves with motorcycle production. B. S. A. has for many years made complete machines; the show of 1919 saw the introduction of the Beardmore 3½-h.p., two-stroke machine with a number of novel and commendable features, such as the use of pressed steel for a fuel tank forming the top member of the frame, unit power plant and laminated springs, back and front.

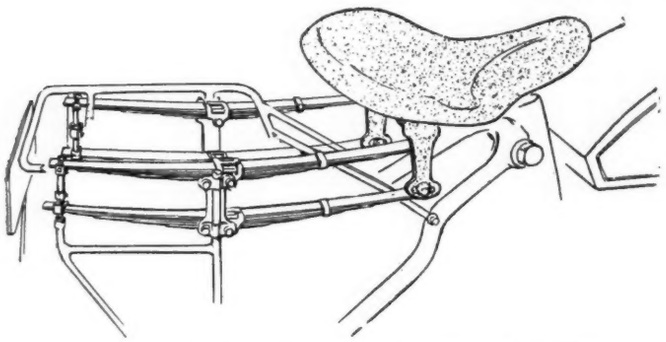
Individual and Aggregate Outputs

The great majority of British makers of motorcycles are quite small firms who consider they have done well if they reach an output of 300-400 per annum. There are only two whose output is believed to approach five figures; namely, Triumph and Douglas, both having probably turned out a similar number since last show, approximately 8000 machines each. But as with cars, so with motorcycles, British makers are very secretive concerning outputs. It is estimated, however, that the

aggregate number produced during 1920 will be approximately 50,000 from all plants, which averages, roughly, 500 each.

Engines

Dealing specifically with the engineering features of British motorcycles in general, it may be said that, while for lightweights having engines up to 2¾ h.p., two-cycle engines with crankcase compression are used in 45 per cent of cases; this form of motor is not made above 3 h.p. except in isolated cases. Nevertheless, the two-stroke motorcycle engine up to 4½ h.p. has shown itself to be quite satisfactory under normal conditions of use. A machine with an engine of this type and power, having a bore and stroke of 85 x 88 m.m., was introduced at last year's show. This is the 4½-h.p. Dunelt, which has a two-stroke crankcase compression engine, three-speed



Four semi-elliptic springs supporting A. J. S. saddle independently of frame. Springs are anchored to rear luggage carrier

gear-set and chain and belt transmission. It weighs, complete, 260 lb., and put up some excellent performances in last year's big trials.

The Scott is another example of a comparatively high horsepower two-cycle engine, but this has two water-cooled cylinders, 73 x 63.5 m.m. This also stood out very prominently in the big trials of 1920. But, generally speaking, the four-cycle engine is still by far the more popular system, some 80 per cent of all machines having this type of engine.

There are only isolated examples of engines with more than two cylinders. A new machine appeared at Olympia with a four-cylinder motor. This is the first British motorcycle to have a four-cylinder engine, and it is believed to be the first of any nationality of such an advanced design as to embody overhead valves and camshaft, aluminum cylinders with steel liners and certain other features hitherto only associated with car engines. The transmission of this new machine is also distinctly unusual, for from the three-speed gear-set skew gearing conveys the drive to a countershaft and thence by roller chain to the rear wheel. There is one example of a British motorcycle with a three-cylinder, radial, air-cooled motor. This also is an experimental production and did not appear at Olympia.

Number and Arrangement of Cylinders

Apart from these isolated examples, 62 per cent of British motorcycle engines have only one cylinder. Of the remaining 38 per cent with two cylinders, 25 per cent are of the horizontally opposed type. This represents a small increase in the latter from 12 months ago, and for the first time an engine maker, Coventry Victor, has a stock engine with opposed cylinders; at present it is being used only by three or four small firms with a total output of under a dozen per week. The one example of a two-cylinder opposed engine having the crankshaft longitudinally arranged has dropped out since last year, for the A. B. C. machine, which had an engine thus arranged, is not now being made, its manufacturers having closed down owing to financial difficulties. Bradshaw, the designer of the A. B. C. motorcycle and the A. B. C. (e. g., Dragon Fly) aero engines, has come out with a new horizontally opposed, two-cylinder, overhead-valve engine on novel lines. This is described separately in this report and its peculiar features are worthy of careful consideration.

Only 24 per cent of British motorcycle engines have detachable heads, and side valves are well in the majority, 68 per cent being of this type, while only 6 per cent have overhead valves and 6 per cent inlet over exhaust, the remaining 20 per cent being of the valveless, two-cycle pattern.

One well-known maker, Quadrant, has a side-valve engine with the valves set at 90 deg. from one another in the circumference of the cylinder bore. The exhaust valve is in front of the cylinder and the inlet at the side; thus the pocket of the former is equally cooled on each side, tending to prevent distortion of the seat. The inlet cam is integral with one of the timing gears which drive a lateral camshaft arranged to operate the exhaust valve.

Distribution gearing on nearly all makes is of the straight-toothed pinion type, a long train of wheels often occurring. In one case, a single-cylinder James, there are six pinions in all, but in isolated cases a roller chain is utilized.

Engine Bearings

The plain bush for crankshaft and big-end bearings is slowly being displaced by ball and roller types. The majority of recently introduced models have ball bearings for the crankshaft and roller bearings for the big ends, and, while J. A. P. engines in the larger sizes have normally plain journals, they are also supplied with a ball bearing on the pulley or chain sprocket side and a plain bearing at the other end of the shaft. The fact that this maker also favors plain bearings for the big end accounts for the fact that 61 per cent of engines are fitted with this type of connecting rod bearing. If J. A. P. were ruled out, the majority of big ends would have rollers. However, J. A. P. cannot be ignored, for, as already stated, he supplies the greatest number of stock engines. The following percentages, therefore, apply to British motorcycle engines of all sizes: Of crankshaft bearings 45 per cent are plain bushes, 36 per cent ball, 13 per cent roller, while 6 per cent of engines have ball and plain. Of big ends 61 per cent have plain bearings, 36 per cent rollers and 3 per cent balls.

Cylinder and Crankcase Construction

With the exception specified, cylinders are invariably of cast iron with circumferential radiating fins. Usually they are secured by four studs and nuts to the top of the aluminum crankcase, which is vertically divided at right angles to the crankpin axis. In one instance, the Corona, a new job with a planned output of but 500 per annum, the cast-iron cylinder and crankcase are cast as a unit, with the exception of an end plate of aluminum for the crankcase. While in four-stroke engines a pair of internal flywheels are normal with a coupling forming the crankpin, the Corona has a single outside flywheel, in which respect it resembles the two-stroke motors. One maker of a two-stroke lightweight engine machines the top of the head off flat and fits an aluminum cap with horizontal fins, securing it by a central hexagon-headed screw.

Pistons

Aluminum pistons have not secured much favor with motorcycle makers, and at the present time only 2 per cent of engines are so equipped; cast iron is, therefore, almost universal with three rings in 65 per cent and two in 35 per cent. There are several cases of the total number of rings being divided between crown and skirt. Sunbeam and Rudge engines, for example, have only one ring in the crown, the second being near the bottom of the skirt, where it serves as a scraper.

In four-cycle engines the flat-top piston with internal webbing is general, while in two-cycle motors the piston has cast with it a deflector to separate the induction and exhaust gases when both valve ports are open.

Unlike British car engines, the majority of those in motorcycles still have the wrist pin fixed in the piston bosses. There are only 19 per cent otherwise arranged, one-quarter the number of these floating in both piston and rod and the remainder being fixed in the rod.

In some cases where the wrist pin is fixed in the piston no endeavor is made to locate it except its own good fit in the piston bosses. Occasionally one end is slightly tapered, but not infrequently a parallel sided pin is used. In B. S. A. engines the wrist pin is tapered at one end to fit a taper hole in the boss; the latter has an internal groove which prevents lateral movement through the agency of a spring wire ring located in a corresponding groove around the pin.

The floating pin of Rudge engines is located by a spring wire ring in a groove at each end of the piston boss; in other cases a copper plug is driven into the bosses at each end.

Ignition.

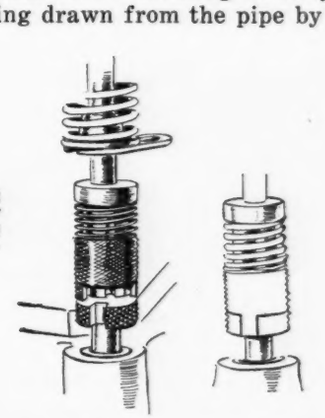
The magneto is universal for ignition, but in the case of the Villiers stock engine, a two-stroke model with the largest output of this type and fitted to over a dozen different makes of lightweight machines, a flywheel magneto is used. This has stationary coils of large dimensions and a stationary contact breaker, all mounted on a side plate around which rotate the pole pieces within the dished flywheel; all parts including flywheel are thoroughly enclosed by a dished coverplate. An advantage of this magneto is that it has double the range of advance and retard of the ordinary type, a feature of great importance in two-stroke engines, even ignoring their comparatively high speeds of rotation.

Engine Lubrication

Of engine lubrication systems there is almost endless variety, the modifications being so diversified as to prohibit any reasonable classification being made; but the purely splash system occurs in the majority of cases, the oil being delivered to the crankcase through a sight feed on the top tube, the oil being brought to this point from the tank by a semi-automatic pump. The plunger of the latter is intended to be raised or depressed by hand, a spring returning it to its normal position and delivering the oil under slight pressure to the adjustable drip feed and thence by gravity to the crankcase.

There is, however, a slight tendency toward the elimination of the separate oil tank and the carrying of the oil supply in the crankcase sump. In one or two instances, as for example, the 4½ hp. two-cylinder horizontally opposed Humber and the single cylinder Corona, the oil in the sump is delivered by a mechanically driven pump to troughs under the big-ends. But next to the simple splash the most popular arrangement is a mechanically driven pump in the crankcase, which is rotated by reduction gearing at 1/30th to 1/40th engine speed; it draws oil slowly from the bottom of the crankcase (the latter fed by drips from a top tube tank) and delivers it to the drilled crankshaft for main and big-end bearings, and thence by splash to the cylinder walls. A hand pump can be used to send charges direct to the crankcase to supplement the drip feed.

Appreciable difference is apparent in the majority of cases in the method of lubricating two-stroke engines. Until 12 months ago the prevailing method was to mix fuel and oil together in certain proportions and to rely upon the oil thus fed through the carbureter into the crankcase with the fuel on the suction stroke. But while Triumph and one or two other makers retain this system the majority now separate the oil and fuel supplies. The usual arrangement is a drip-feed delivery to the cylinder wall, the outlet having a non-return valve, and being uncovered by the piston during the upper two-thirds of its stroke and therefore delivering directly to the crankcase, the oil being drawn from the pipe by the partial vacuum occurring below the piston on its upward movement.



Finger tappet adjustment of Ariel engine. Finger plate forming valve spring anchorage is also illustrated

Levis, who may be looked upon as the originator of the two-stroke lightweight machine, has a drip feed supply to a branched pipe, one lead being taken to the cylinder wall and the other to one of the journal bearings of the crankshaft. Excess of oil from the cylinder wall drains into a gallery at the top of the crankcase and thence through an internal duct to the other crankshaft journal at the belt pulley end. The crankshaft is drilled and some of the surplus in the journals is carried by centrifugal force to the big-end.

In one case, the Precision stock engine, the main oil supply is carried in an aluminum chamber forming a side extension to the crankcase, but separate from the latter. The crankshaft projects through its journal bearing into this oil compartment and carries a chain sprocket for the magneto driving chain. The latter is enclosed and acts as a conveyor for the oil, lifting the latter into troughs whence some of it runs by gravity through an adjustable drip valve into the cylinder and so by suction to the crankcase on the up-stroke of the piston. This arrangement has the advantage of keeping all the oil in the neighborhood of the engine and introduces no extra parts, while enabling the magneto chain to be run in a bath of lubricant.

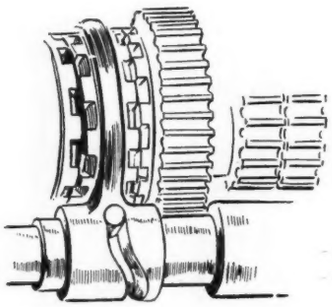
Engine Starting

The foot-operated lever ("kick starter") is almost universal where any means of engine starting other than pushing the machine is provided; Enfield is one of isolated examples having a handle, while Rudge is unique in having pedalling gear for starting the motor—not for moving the machine. Kick starters have toothed quadrants, which mesh when operated with a pinion; the latter is mounted on a quick thread and has a face ratchet drawn into engagement with a ratchet on a gear set wheel when rotation occurs.

Clutches

Ninety-five per cent of the clutches are of the plate or disk type. In those used for engines of small power, in lightweight machines, for instance, the single-driven plate pattern prevails with cork inserts, this being the type embodied in Sturmey-Archer two-speed gearsets, but with engines over 3 hp. the vast majority of clutches are of the multi-plate type, 90 per cent of these running dry with fabric friction surfaces against metal disks, the remainder being metal to metal and running in oil.

Clutch control by hand occurs in the vast majority of machines, approximately 85 per cent being so equipped, but in quite a number of instances where two-speed gearsets are used no friction clutch is provided, the gear changes from low to high being effected whilst the throttle is closed or the exhaust valve is momentarily held off of its seating by the usual lifting device. This



Forks operating dog clutches of B. S. A. gearset are moved by pins on rotary shaft working in slot of fork bosses

absence of a clutch of course prevents an engine being started in neutral with the machine stationary and a gear engaged to move off; the neutral position is only utilized to wheel the machine, the engine being started by engaging the low gear and pushing or "paddling."

There is good reason for the hand control of the clutch, for with foot control the rider is at a disadvantage in not being able to move off from rest, with a solo machine, by straddling with both feet on the ground. In traffic riding especially this is an important point.

Gearsets

As already mentioned, the use of stock components is most pronounced in gearsets, 55 per cent of machines being so fitted. The majority have the gear wheels constantly in mesh, gear changing being effected by sliding dogs. The straight through change of gear shift is almost universal, there being only one example (a four-speed set) of the selector system as used on cars. Adjustable belt pulleys are used in place of gearsets by two or three prominent makers, Rudge and Zenith being the most noteworthy of these. Of the remaining machines 54 per cent have three-speeds. A great many of the lightweights can be obtained and are preferred without gearset at a reduced price. Obviously when so equipped they are suitable only for use in flat or merely undulating districts, for their hill-climbing powers are then, it need hardly be said, distinctly limited.

The unit construction of engine and gearset is not making any appreciable headway, for in 90 per cent of machines these components are separately mounted, with a primary chain drive from one to the other. An interesting combination of a unit and separate systems occurs in one instance, a lightweight termed the Metro-Tyler, which has the crankcase and gearcasing bolted up within side plates and a cradle with a top cover, which incloses the magneto midway between the engine and gearset. These three items, therefore, constitute a unit, which is mounted as such in the frame. The Wooler unit has the three-speed gearset below the crankcase of the horizontally opposed engine, the crankshaft drive to the gears being by straight cut pinions which eliminate this primary chain of the transmission; the final drive is by exposed chain.

Transmission

The most popular type of transmission for British motor cycles of all sizes is the combination of chain and belt. As already stated, the engine is in the vast majority of cases mounted separately from the gearset, and a roller chain is used to transmit the power from the crankshaft to the primary shaft of the gearset. From the latter to the rear wheel a belt is used in 48 per cent of machines, an all-chain drive occurring in 40 per cent, the remainder being all-belt. It is by no means universal practice to inclose the driving chains, in fact, while in the majority of cases the primary chain is inclosed, and lubricated by oil vapor from the crankcase breather pipe, the final chain rarely has more protection than a top shield. When chains are inclosed the casing usually consists of sheet metal, but in a few instances, B. S. A. is a good example, a cast aluminum chain case is fitted and obviously makes a much more workmanlike and permanent job. Chains are always adjustable, the primary one, as a rule, by sliding the gearbox backward or forward on its mounting; whether or not the rear chain requires adjustment, shifting the gearbox obviously necessitates some movement of the back wheel center to correspond. Douglas, in a new model with all-chain drive, rests the horizontally opposed twin engine on two longitudinal tubes and adjusts the front chain by sliding the engine backward or forward by means of a long draw bolt.

As previously inferred, the all-belt transmission is only used on 12 per cent of British machines. Usually only a single gear ratio is then provided, with a direct drive by belt from crankshaft pulley to the rear wheel; but as already mentioned Rudge and Zenith among others use as variable pulley to provide alteration of gear ratio in conjunction with an all-belt drive.

Only one British maker has adopted shaft drive, and that on a scooter, the Unibus, which has worm gearing on the back axle.

Frames

The tubular frame is practically universal. Pullin, however, as already mentioned, has a pressed steel frame, but did not show at Olympia, while in the Beardmore Precision the pressed steel fuel tank forms the top member of the frame and the steering head.

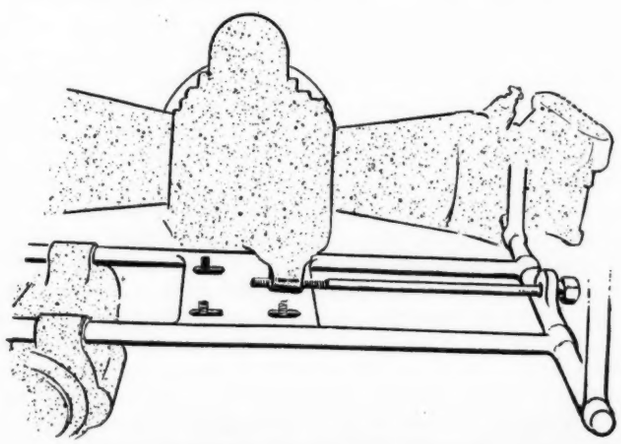


Diagram indicating mounting of Douglas horizontal twin engine in frame with draw belt adjustment for primary chain

Rear sprung frames are not increasing to any pronounced extent, 90 per cent of machines being rigid. Where the rear portion is sprung, the laminated spring is becoming increasingly popular, and there are additional examples this year of laminated sprung front forks. Most of the rear sprung frame designs are distinctly involved and costly to produce and probably the desire to keep down prices has discouraged the flexible rear suspension as more general practice.

The simplest system is the Wooler, which has its front and back axle ends mounted between pairs of coil springs and guided by slide blocks in slots in the spring cylinders.

There is no uniformity whatever in frame design, sprung or rigid. No attempt has been made to standardize this part of the machine, though one accessory maker, Brampton, has recently put forward a spring frame for assemblers, but this has been utilized by only one well-known maker up to the present.

Wheels and Tires

The use of interchangeable wheels is increasing slowly in the case of the expensive side-car machines with all-chain drive, any of the three wheels being interchangeable and carried when in position on "knock out" spindles, with a distance piece which is detachable when the spindle has been withdrawn, so that the wheel hub driving dogs or splines may be disengaged from the chain sprocket, the latter invariably remaining undisturbed when the wheel is withdrawn. A variation of this is seen on the only British four-cylinder machine, the Superb Four, which has journal ball bearings secured in the stay ends, the inner races and also the hub and chain sprocket having hexagon holes to receive the hexagon knock-out spindle.

But even where the wheels are not actually interchangeable, provision is frequently made to allow the rear wheel to be readily withdrawn, the knock-out rear spindle system being utilized for this purpose.

There is an increasing tendency to use tires of larger cross section in the heavier classes. At present the largest standard wheel and tire size is 28 x 3 in., but in the heavier tires it is probable that 3½-in tires will not be unusual in the near future. The 26-in. diameter wheel is, however, the usual size with a 2½-in. tire for medium-weight machines; for the lightweights a good many makers use 24-in. x 2¼-in. wheels and tires, though quite as many fit wheels of 26-in. diameter.

Disk wheels are not standardized, but detachable disks for wire-spoked wheels are supplied by some makers as an extra and by accessory firms. But the effect of side winds on the steering of solo machines with wheel disks does not encourage the use of the latter.

Mudguards

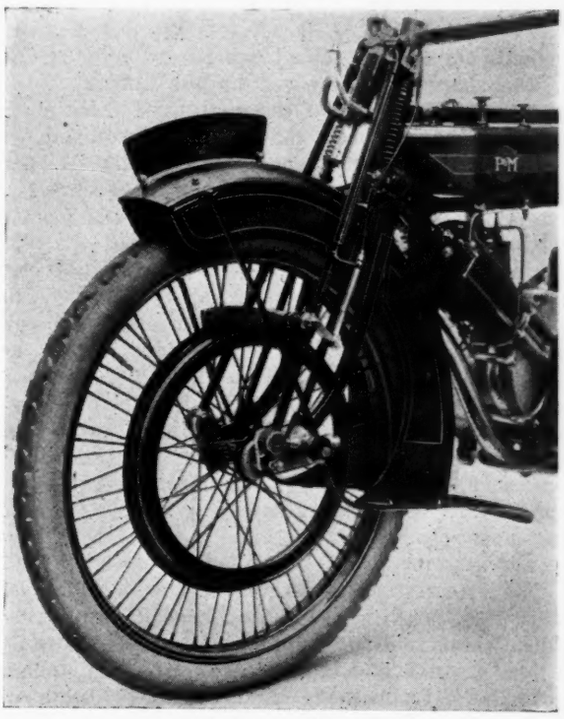
Mudguards are becoming wider, 5 to 7 in. being by no means unusual, in fact Ruby and Rover have 8-in. dome-shaped guards on the side-car model. The fitting of valances to the front is normal practice on medium-weight and heavy machines, though for rear mudguards a valance is somewhat exceptional. In place of a valance at either back or front some makers prefer flat side extensions of the curved guard.

To facilitate wheel removal and tire repair the back half of the rear mudguard is occasionally made easily detachable or, as in the case of the Rover, is hinged upon or with the rear carrier. The back end of the rear mudguard is usually supported by the stand, and in approximately 20 per cent of cases the front mudguard is similarly located, for front stands are increasing in number. Only in isolated cases is the stand pivoted roundabout the center of the machine, Douglas, one of the firms with the largest output (8000 per annum) arranging a single stand in this position.

Brakes

Although it appeared probable at the 1919 show that a horseshoe brake with pads apply to the front tire rim was being rapidly discarded, it has not lost ground during the past twelve months, and 76 per cent of machines have this type of brake despite its universal condemnation by users; 18 per cent have a special V rim secured to the spokes, to which a segmental pad is applied; 4 per cent have expanding shoes and 2 per cent contracting bands, both the latter applying to drums of from 5 to 8in. diameter secured to the hub.

The prevalence of the belt transmission, with or without a primary chain, accounts for the fact that the rear belt rim is made use of for back brakes in 56 per cent of machines. Only 4 per cent of makers fail to make use of this rim when a belt drive occurs. Of the remainder, 25 per cent have expanding shoes in 6 to 8-in. diameter drums, 14 per cent fit a special V rim, as in the case of the V rim front brake already referred to, and 5 per cent have contracting bands.



P & M front wheel V rim brake, typical of many others to supersede tire rim brakes

Only two makers concentrate the brake gear on the rear wheel, the Bat having expanding shoes within a drum attached to the hub and a contracting band on the outside of the same drum, while on the Coulson two contracting bands applying to hub drums are used.

A CABINET Conference held in Tokyo has passed the draft of the revised Japanese patent laws. The new laws, which will be immediately presented to the Imperial Diet for approval, provide for the collection of public views as to patents applied for before the applications are officially considered, the fixing of the period of cancellation of patents within five years after their being granted, the granting of patents to the actual inventors or employees inventing for their masters, and the giving of the preferential right of patent to the earlier application in case two applications are submitted for the same invention.

Poppet Valve Manufacture Requires Special Equipment

Automotive engineers will be interested in this description of poppet valve manufacture. The article discusses in detail the various operations and methods. Many special machines are used because the manufacturing problems differ from those of the ordinary machine shop.

By J. Edward Schipper

MANUFACTURE of gasoline engine poppet valves calls for some unusual equipment both because of the shape of the valve and the difficult functions which it has to perform in the engine. It has been generally found that different materials are required for the stem and head, and a great many of the valves in use are employing cast iron heads with carbon steel stems. Such a valve is manufactured by the Schlieder Mfg. Co., which specializes in this product. The capacity of the plant is 25,000 valves per day, operating on a 9-hr. per day basis.

Manufacturing this number of valves calls for the use of a great many special machines, the largest part of which have been designed in the Schlieder factory, as the problems encountered are widely different from those met in the ordinary machine shop. The factory building is a three-floor, 50 by 180-ft. structure, with a three-floor, 50 by 110-ft. wing. The main part of this building was erected in 1916, and the addition put on in 1918 to double the capacity of the plant, allowing it to reach the 25,000 per day now possible.

The valve is made up of two parts, the stem and the head. The stem stock is carbon steel, which very closely approximates the No. 1010 S. A. E. specification, the only difference being that the sulphur limit is kept lower. The heads are of very fine quality gray iron, no steel being permitted as extraordinary hardness is very undesirable.

The first operation in manufacturing the valve is to cut off the stems to a length 3/8 in. longer than is required by the finished valve. The stem stock is rolled .010 in. oversize, so that the raw stems as they leave the turret lathe shown in Fig. 1 are this much larger in diameter and 3/8 in. longer in length than the finished product to allow for future machining. The unusual feature of the turret valve used for cutting off these stems is the automatic feeder which is a special type of feeder which brings the bar up to the stop on the turret for the cut-off. The cut-off operation is simply a cross-cut.

The heads, which come as cast iron disks, are first drilled on a special six-spindle machine arranged so that the spindles are placed in a vertical line as shown in Fig. 2. This machine has a capacity of 1000 heads per hour. It is a cam-feed arrangement and the holes drilled are .010 in. smaller than the diameter of the valve stems. The purpose of this is in the welding operation, which is later described when the heads are shrunk onto the stems before they are welded.

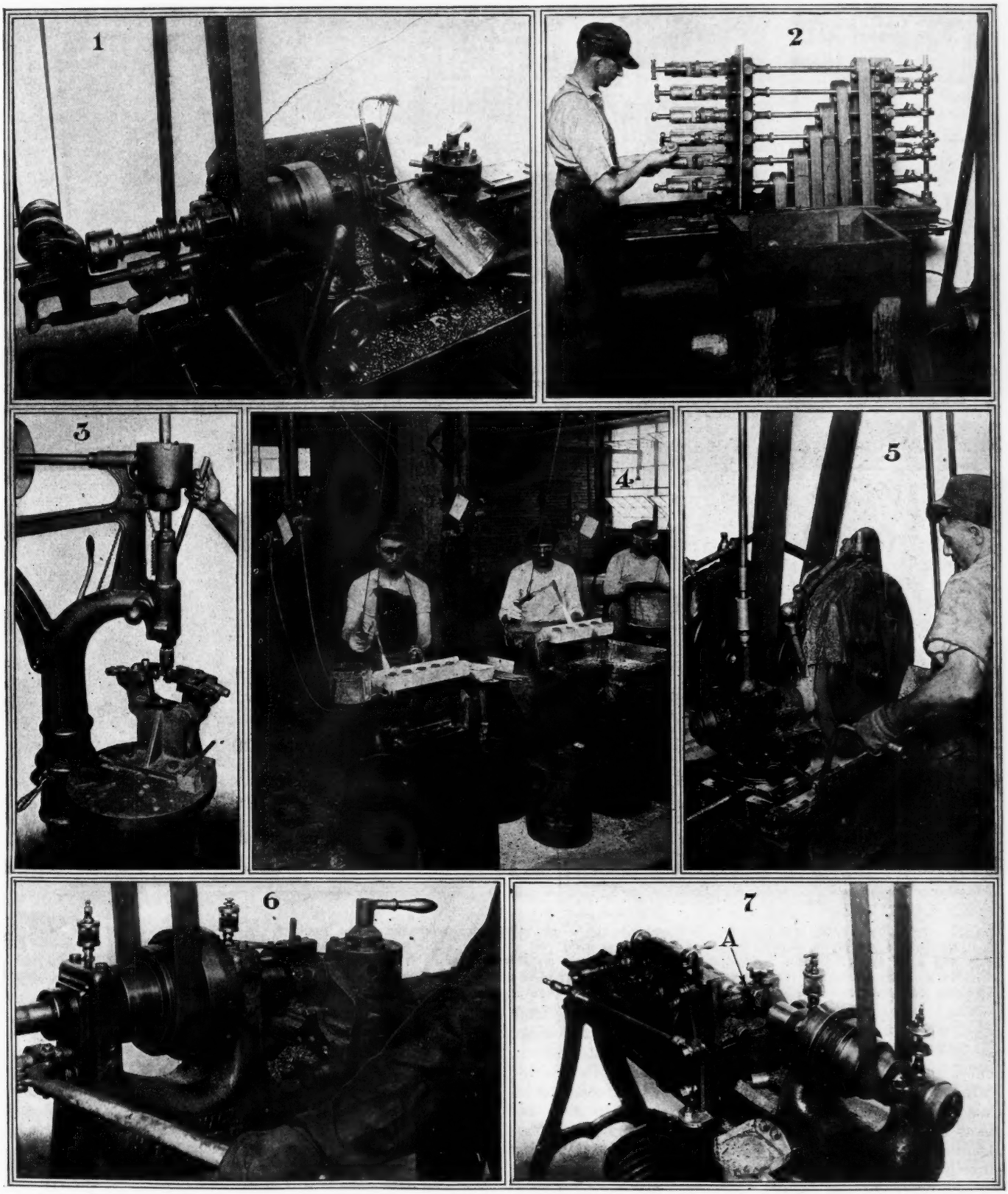
Following the drilling operation on the head, a countersink tool cleans out the countersink which is cast into the head. This operation is on a hand-fed machine with a special chuck to hold the head, and is illustrated in Fig. 3. The valves are now in position for the welding operation, which is by the oxy-acetylene process. The torch is first directed on the valve head, expanding it, and the stem is then pressed in. The stem is then welded over inside the countersunk portion of the head with a special flux which fills up the entire countersink and forms an intimate juncture between the cast-iron head and the carbon steel stem. When the carbon steel stem is forced into the head a small portion of the stem projects through, and in the welding process this is turned over and joins with the flux in filling the countersunk portion above the cup-shaped depression in the head. This not only gives a welded connection, but a sort of rivet effect, which gives a very firm juncture between the head and stem, and, in fact, makes it practically a unit part.

When the valves have been through their welding process, they are thrown into pans adjacent to the welding stand and there allowed to slowly cool. Inasmuch as these pans retain the heat from the welded valve, a sort of annealing action is provided which promotes the homogenity of the metal. The cooling in these pans is so slow that the valves cannot be handled for 24 hr.

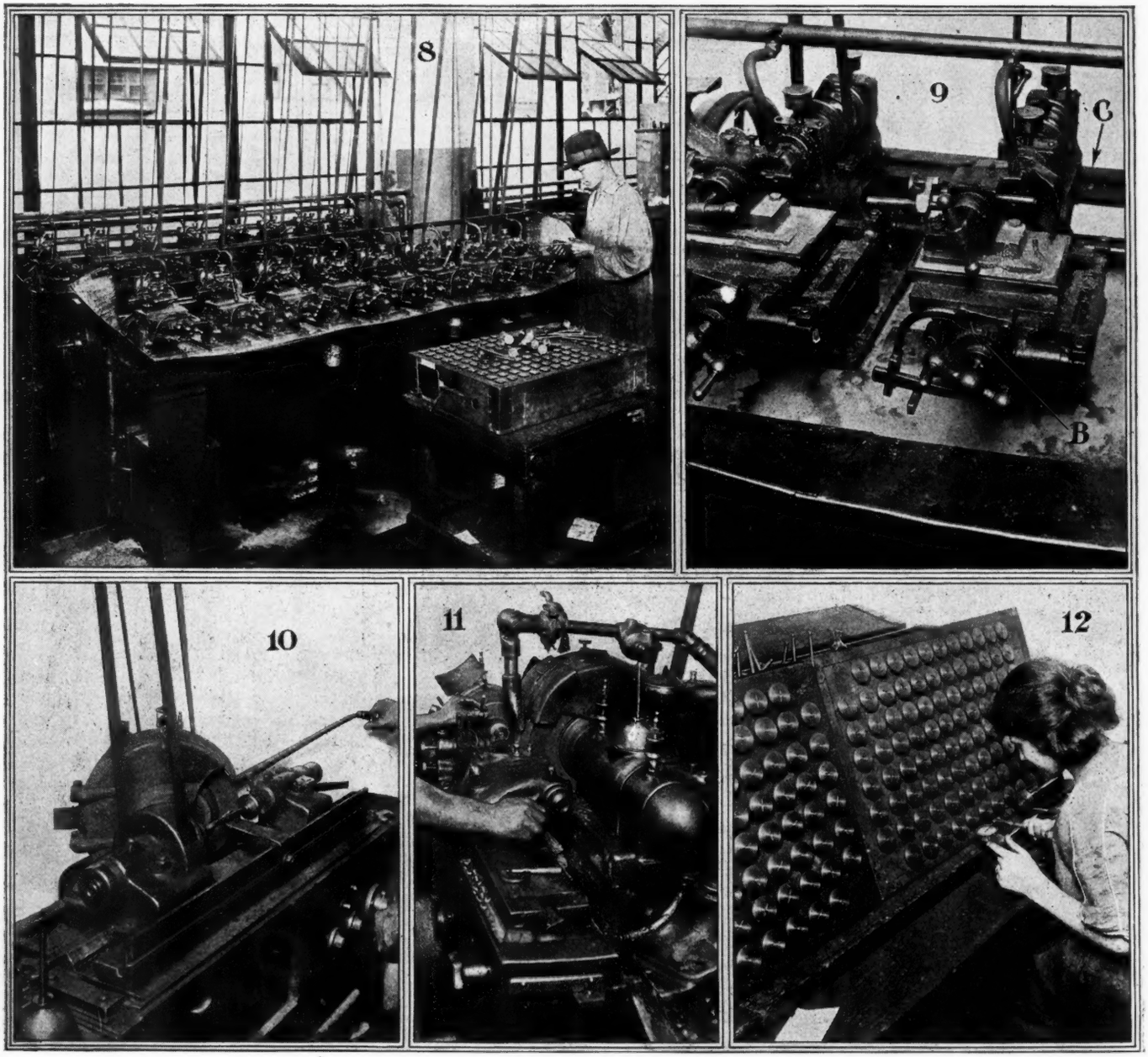
After the valves are removed from the cooling pans they are given a rough grind on the top of the valve head and the scale is ground from the bevel or seating edge of the valve. This scale is extraordinarily hard and would be very destructive to the tool if it were not removed before the machining operation. The rough grind is shown in Fig. 5.

All of the work which has been done up to this point is preparatory to the machining operations. The valves are now slipped into special counting racks holding 100, 150 and 200 valves and are then passed along for the preliminary inspection. This inspector notes the weld and sees that the scale has been removed from the heads and bevel seats so that there is no danger of tool damage from this source.

The first machine manufacturing operation on the valve is that of forming the head. This is done on a turret lathe with a compound tool. The operation is shown in Fig. 6. The machine is an ordinary Fuller turret lathe, the interesting feature being the cutter, which works on a cross-feed. This tool cuts the outside diameter of the valve, forms the seats and forms the underside of the valve to proper radii. The operation is located from the valve stem diameter, which is held in an ordinary chuck. After the head is formed in this rough forming operation, the heads are given center marks for locating the finish grinding and machining work on the stems. The centering operation, which is shown in Fig. 7, is done on a special machine, the stem being clamped in a V-block which serves as a locating means. When so clamped the



1—Cutting off stock to length 3/8 in. longer than finished valve stem. Stock is .010 in. diameter larger than finished stem. 2—Drilling the cast iron valve heads on a special machine which drills six at a time. 3—Cleaning out countersinks in the valve head casting. 4—Welding valve stems to valve head. The stem projects within the countersunk portion of the head and after welding, the projecting piece of stem and the flux when fused fill the entire countersunk portion. 5—Rough grinding the valve head to take off the hard scale after welding. 6—First machine operation which forms the head and seats of valve. 7—Operation for establishing center of valve head, locating from diameter of valve stem by means of V-block at A.



8—Eight-headed machine for slotting the stems of valves for overhead valve engines. 9—Enlarged view of one of the heads on stem slotting machine. B—Connecting rod bars for establishing reciprocating motion of heads. C—Ratchet and pawl feed for table. 10—Grinding the valve seat on a Star wheel. This grinds a 45 deg. seat on the valves, only a very light cut being taken. 11—Finish grinding the valve stem. Note the locating center point on machine. 12—Gaging the valve on final inspection. The racks contain counted valves and the inspection operation consists of a go and no-go gage on the valve stem and an amplifying gage for testing concentricity of head and stem.

center spot is accurately placed in the head of the valve.

On the overhead valves which are used in the Buick, Chevrolet and other motors, it is necessary to slot the stems of the valve, and this is done on a very ingenious machine which is capable of handling 8 stems per min. In other words, the special machine can handle as many stems per minute as it has heads. The machine illustrated in Fig. 8 is an eight-headed machine, and is, consequently, capable of slotting 8 stems per min. A close-up on one of the heads is given in Fig. 9. It will be seen that this machine, which is a product of the Schlieder company, is very highly ingenious in its operation. A crank arrangement allows the head to swing back and forth. This is the portion which carries the belt pulley. The operating bars, to give the reciprocating motion to the head, which is really a side-to-side swing, are shown behind the machine at *B*. This head carries the cutter, and the table which carries the valves is fed up to it by a ratchet and pawl arrangement, *C* which connects with a worm feed. This advances the work toward the cutter at the desired rate.

All of the valves are given either a screw-driver slot in the head or two small holes to hold the valve grinding tool, are placed in the valve on either side of the center mark. The slotting operation is done on an ordinary saw and the two pilot holes are put in by a short drill, and the valve is then ready, practically, for its finish grind.

Special valves for certain makes of cars require some additional work on the stems such as, for instance, putting a groove at the bottom of the stem, chamfering the bottom,

etc. All of the valves, before going to the grinding, are cut off at the correct length from the seat, but some of them require these special slots or key holes which take the particular type of valve spring retainers needed. In order to provide the wearing surface necessary at the bottoms of the stems, these are cyanided to give them the hard skin necessary as a wear resister.

The heads are rough ground on a Landis grinder, the same operator taking care of both the rough grind and finish grind. This is done as it is then possible to hold the operator responsible for the finished valve. It has been found where one operator took care of the rough grinding and another the finish grinding that it was impossible to locate inaccuracies. Each grinder, of course, being positively certain that it was the other one who caused the trouble. The way it is worked out now, the .010 in. oversize is ground off all by one grinder. He takes off .008 in. on the rough grind and .002 in. on the finish grind, and on a 9-hr. basis, he will be 6 hr. rough grinding and 3 hr. finish grinding.

Probably the most interesting operation in the entire manufacture of the valve is that of grinding the seat. This is done on a Star grinding wheel which takes a very light cut, the depth being just sufficient to give the desired seating surface. This wheel is illustrated in Fig. 10, and it has been selected after a long search for the proper equipment for this work. The stems are then finish ground, the excess metal which was left at the beginning on the stems being taken off on this cut. This operation, which is shown in Fig. 11, is a straight grinding operation without any exceptional problems. The valves are then checked and gaged for diameter and concentricity. The final inspecting operation is done by girls, the operation being shown in Fig. 12. On this operation the operator has two gages, an over and under go and no-go gage for the stems, and then a concentricity test which is shown in operation in the illustration. The valve is placed in a V-groove, turned about with an indicator pointer of an amplifying gage resting against it. A variation of over .002 in. is sufficient to cause rejection of the valves. Following this final inspection, the valves are flushed in oil, wrapped and packed for shipment.

German Organization of the Factory Inspection Department

THE organization of the inspection department in a machine shop engaged in the production of interchangeable parts was covered (from the German point of view) in a paper recently presented to the Dresden Section of the Verein Deutscher Ingenieure by Prof. Toussaint. In the first place there is to be created a department to which may be referred all questions relating to measurements and fits. This department should be accorded a large degree of independence, as it represents in a sense the conscience of the works and is responsible for the interchangeability of the products of the plant. The superintendent of this department should represent the firm on all standards committees that are working on the standardization of systems of measurement and fits, that concern themselves with questions relating to standard measuring or gaging temperatures and with the standardization of tools. He must conduct correspondence with the government department of weights and measures, obtain the reference gages for use in disputes concerning shop gages and see to it that these reference gages are periodically checked by the government department.

The inspection department should also work up instructions for checking measuring instruments and tools and machines. It must determine when gages are to be regarded as worn out and should therefore be withdrawn. It should furnish drawings and specifications according to which the inspectors pass tools and machines. It is charged with the proper storage and issuing of the gages, preferably in such a way that the gages for any particular job are let into a board. When the gages are turned in at the end of the week, the inspection department should be able to immediately observe any injuries they may have received and subject them to a checking process before they are handed out again.

It devolves upon the inspection department, moreover, to study the checking systems in use in the works as to their suitability and to improve upon them, to work out new inspection methods and to introduce them into service after a suitable try-out. To this end the inspection department should be furnished by the works library all publications relating to the subject of inspection and gaging.

Aside from instructions for checking the shop gages, there should be worked out general instructions regarding the use of gages in the shop. It is advisable to instruct the engineers, foremen, inspectors, assemblers and better machinists in regular courses, which results in better cooperation between drafting room, shop and inspection department. In the lectures such terms as nominal dimension, fit, tolerance, maximum dimension, minimum dimension and tolerance unit should be made plain. The location of the zero line, the influence of the gaging temperature, and the different kinds of fit should be discussed. The markings and inscriptions of the gages should be explained and shown by samples, and this should be followed by a general discussion on the system of inspection in use in the plant.

Oilless Bearings

TWO forms of oilless bushings or oilless bearings are manufactured by the Massachusetts Oilless Bearings Company. One is a bearing made of certain grades of wood impregnated with lubricant. Six different densities of lubricant are used, suiting the bearings to different conditions of load and speed. These bearings are known as phosphor lignum bearings and are used for shafts running at from 25 to 25,000 r.p.m., we are informed. These bearings are not a stock product but are made to order for any particular application. The phosphor lignum bearing is said to have a crushing strength equal to that of a babbitt bearing, to be moisture and oil-proof and not to swell or shrink under climatic conditions.

The other type of oilless bearing referred to is known as the Cole graphite matrix bearing. This is a cast metal bearing, the graphite being incorporated with the metal. The bushing comes ready to be pressed into the housing and must not be reamed or machined. In case the bearing has to be fitted to a shaft it is recommended to dress, the shaft not to ream the bearing. The minimum thickness of wall is ⅛ in. and the following tolerances are worked to are medium sized bearings: Length, ± 0.010; inside diameter, ± 0.001; outside diameter, ± 0.001. These bearings too are made special for different applications, the proportion of graphite being varied.

Detailed Analysis of Holland as Market for American Automotive Products

Lack of domestic automotive manufacture renders Holland an excellent market for foreign products. The facts presented here will be of definite value to the manufacturer seeking Dutch trade. Motorcycle delivery cars are popular. There are about 10,000 automobiles in use in Holland.

By Coldwell S. Johnston*

ALTHOUGH always difficult to properly estimate the value of any foreign territory as a market, one will find the problem simplified if able to visualize the size of the country with known home districts and to know the population, its wealth and area, as well as its buying capacity and other characteristics.

Holland, or to be more correct, the Netherlands, is the smallest, with one exception, of the important countries of Europe. Its area, 12,000 square miles of land or gross total of 15,700 square miles with inland waters, is less than that of either Denmark or Switzerland, although its population of seven millions exceeds the combined population of these other two countries by several hundred thousand.

There is only one real manufacturer of automobiles in Holland, and a rich and thrifty population has to buy practically all of their motor cars from abroad.

The nearest tabulation of the number of automobiles in licensed circulation in Holland is obtained from the Royal Automobile Club, The Hague. The secretary states that the number of pleasure cars in use does not exceed 8000 or 9000; this seems too conservative, in view of the fact that 3000 cars alone from the United States were imported last year out of the gross total of 6000 from all parts of the world.

If we base our estimate on 10,000 automobiles as being in use in Holland, which is about correct, this would show only one automobile to every 700 inhabitants, as compared with one to every twelve persons in America.

At the beginning of the year 1921 there were only 20,000 motorcycles in use in this country and a steady demand for more.

The year just ended far surpassed all others as to records in number of passenger automobiles exported from U. S. A. The total is over 125,000; the first ten months of 1920 show 112,376, or double the figures of 1919, which were 67,145.

After the United Kingdom and British possessions, the Netherlands tops the list of foreign buyers with 2565 cars taken in ten months from the United States, and the Dutch East Indies with 3439, all in the ten months for which we have official figures, making a total of 6000.

Therefore, with the safe estimation of 3000 cars having been sold in Holland in 1920, of a total value of Fl. 12,612,000, or an average declared value on importation of about Fl. 4,200 per car, the important question is what are American manufacturers and exporters of automobiles going to do to increase, protect and maintain the Dutch market? (See my report published in Commerce Reports No. 306, dated December 30, 1920.)

*American Commercial Attache, American Legation, The Hague, Netherlands.

Foreign Representatives

There are in Holland the following number of automobile agents from the various foreign countries:

American	27
French	26
English	24
German	19
Italian	7
Belgian	3
Swiss	1

A questionnaire was sent recently by the Bureau to all of these agents concerning various topics of interest to the American automotive manufacturer. A digest of the replies is presented here.

Vehicles in General

But for a temporary overstock the demand for cars is good, and revival of selling in the spring will no doubt move all cars now on the dealers' floors. The attached statistics show the imports of automobiles into Holland during the year 1920 in comparison with the year 1919.

The percentage of cars in use of domestic make in Holland is negligible, there being only three manufacturers or assemblers of motor cars in Holland, so that practically all automotive vehicles in Holland are imported.

The total production in Holland of cars would not exceed, if it equals, a couple of hundred cars a year, excepting Spijker.

The Spijker plant, the most important concern producing automobiles in Holland, estimates a yearly output for 1921 of 100 cars per month, but as this car is to be a superior six-cylinder vehicle, selling for approximately Fl. 20,000, it is very doubtful now, under the financial conditions ruling, if a thousand such cars can be produced, or even half that number manufactured in Holland and sold here or abroad. The bulk of the production last year, which sold for half the price of their new model, went to England, amounting to some 350 cars of the four-cylinder model, selling to 12,000 guilders.

Passenger Cars

Holland is less affected by the depressed conditions in the European market for the sale of motor cars than any other country on the Continent, with the possible exception of Spain. Money is here and available, and

the American producers control the market to a greater extent than any other nation, although heretofore the reputation of the French car has been one of superior quality and durability.

Trucks

The ample facilities afforded by cheap waterways prevent the development of a large truck business. It is hardly worth while to attempt to force the market with anything larger than a 1½-ton truck, although some 2-ton trucks are noted in daily use.

Trucks of all types and kinds are to be seen in Holland, but the most successful and best adapted are the four-cylinder type motors from ¾- to 2-ton trucks. Exceedingly heavy trucks are rare, and, due to the narrow streets and roadways, are often impractical.

Great popularity is noted in the light delivery car and the adaption for light delivery made to attach to motorcycles for city delivery purposes.

American Advantages

The simplicity of American design and the interchangeability of parts with the quick supplying of spare parts are items that the European makers do not afford their customers. Right here the matter of service is very important and should be developed the same as at home; up to date the subject is badly neglected.

The particular type of car that might prove the best seller is naturally the one combining the lowest first cost and demonstrating its economical maintenance and operation. Europe has long been acquainted with the small-bore, high-speed motor, which has demonstrated to the satisfaction of the European that it is not an extravagant fuel user and the most economical to own.

Statistics

IMPORT OF MOTOR CAR TIRES INTO JAVA

Origin from Where Imported	August 1919	August 1920	8 Months 1919	8 Months 1920
	(Number of Tires)			
Great Britain	140	916	4,270	7,246
France	1,382	2,665	33,216	16,560
Italy	....	440	1,991	8,077
United States	5,251	7,212	35,952	47,710
Singapore	1,358	474	4,378	5,867
Japan	8,967	4,835	64,307	38,594
Elsewhere	1,179	1,749	5,065	9,799
	18,277	19,291	149,569	133,853

IMPORT OF BICYCLE TIRES INTO JAVA

Origin from Where Imported	August 1919	August 1920	8 Months 1919	8 Months 1920
	(Number of Tires)			
Holland	....	4,182	948	15,966
Great Britain	....	590	441	2,287
United States	....	1,002	3,276	4,074
Singapore	350	410	1,625	11,726
Japan	20,521	33,946	85,877	340,108
Elsewhere	....	3,000	14,210	9,824
Total	20,871	43,130	106,377	383,985

IMPORT OF MOTOR CAR TIRES INTO THE NETHERLANDS

Origin from Where Imported	1920	1919
Casings:		
Belgium	6,380	3,062
Great Britain	14,388	31,060
France	7,251	8,015
United States	50,650	27,501
Total including all others	81,332	69,760
Tubes:		
Germany	1,559	145
Belgium	5,106	1,819
Great Britain	11,287	23,888
France	5,840	8,772
United States	40,530	18,408
Total including all others	64,780	53,037

IMPORT OF MOTORCYCLE TIRES INTO THE NETHERLANDS

Origin from Where Imported	1920	1919
Casings:		
Belgium	5,738	1,051
Great Britain	10,163	14,963
France	1,642	2,843
United States	2,156	4,758
Total including all others	20,239	23,701
Tubes:		
Germany	761	211
Belgium	1,854	306
Great Britain	8,050	14,683
United States	2,503	4,237
Total including all others	14,758	21,404

NOTE.—*Regarding Market for Bicycle Tires:* It is remarkable to note here from the above large total of bicycle tires imported from various countries enumerated above no imports of bicycle tires were reported from the United States. The market for this article seems to have been ignored by American manufacturers and as practically everybody in Holland rides a bicycle, American makers should make an effort to obtain some of this business which can easily be had. The same applies to American bicycles, as there are none on the market here in Holland.

IMPORT OF BICYCLE TIRES INTO THE NETHERLANDS

Origin from Where Imported	1920	1919
Casings:		
Germany	58,086	7,184
Belgium	108,746	31,886
Great Britain	333,084	681,693
France	201,504	207,792
Total including all others	755,001	972,610
Tubes:		
Germany	130,345	11,081
Belgium	122,416	49,687
Great Britain	205,568	535,424
France	134,772	150,133
United States	19,653	36,546
Total including all others	632,968	796,271

IMPORT OF SOLID RUBBER TIRES INTO THE NETHERLANDS

Origin from Where Imported	1920	1919
Great Britain	4,678	2,936
United States	1,110	240
Total including all others	6,330	3,202

IMPORT OF AUTOMOBILES INTO THE NETHERLANDS

	1920	1919
Motor Cars Complete with Body:		
Pleasure Cars:		
From Germany	2,144	3,478
Belgium	402	115
Great Britain	207	101
United States	2,968	1,040
Total including all others	6,089	3,478
Trucks:		
From Germany	1,398	937
Total including all others	1,646	1,064
Motor Car Chassis:		
Pleasure Cars:		
From Germany	310	236
Belgium	79	31
Great Britain	48	28
United States	57	133
Switzerland	43	8
France	144	45
Italy	71	2
Total including all others	767	500
Trucks:		
From Germany	159	94
United States	539	66
Italy	32	27
Switzerland	28	51
Great Britain	13	41
	789	295

IMPORT OF MOTOR CARS AND TRUCKS INTO JAVA

Origin from Where Imported	August 1919	August 1920	8 Months 1919	8 Months 1920
	(Number of cars and trucks)			
Holland	..	19	5	67
Other European countries	1	33	10	90
United States	416	286	2,053	2,359
Elsewhere	9	58	60	526
Total	426	396	2,128	3,042

NOTE.—*Regarding Motor Car Tires:* It is always advisable to have cars for export to Holland equipped with millimeter rims to take millimeter sized tires instead of American inch sized tires. This caution is recommended, being advisable here as well as in all other European countries.

The more closely producers aim at a car of the above type the more excellent are the chances of big business developing; to-day the ability to make prompt delivery, supply spare parts quickly and to furnish complete cars fully equipped for the road with ample road equipment are the important items in our favor.

National Preferences

No national preference is evidenced, although, as above mentioned, the French makes are favorably referred to, while a good reputation has been established by the English cars on account of their sturdy construction. The Belgian-block or stone-paved streets and roadways in Holland tend to make many American cars become noisy and develop weaknesses due to the vibration developed on stone-paved ways, where light construction results in rattles and rapid depreciation.

The reputation of German cars has suffered greatly because of the poor material and inferior finish on the post-war German cars being delivered now.

Gasoline Supply

The gasoline supply is mostly drawn from American sources, although an effort is being made to deliver from the Dutch East Indies and from the Royal Dutch Company's source of supply. Few gasoline substitutes are in the market, the most prominent being benzol. The price of gasoline, known as petrol, is 40 to 50 cents (Dutch) per liter, or approximately 60 cents (American) for a gallon.

Credit

Practically all business in Holland is done on a cash basis to the consumer, but if a practical and workable system of partial payments on motor cars were established, similar to that in effect in America, no doubt an additional amount of business would be developed and quicker sales would result.

If this was in force at the present time, it is the writer's opinion that there would be fewer cars on the agents' floors than is the condition to-day.

This system of time purchase as developed in America is not known in Holland, and there is a wide field awaiting any acceptance corporation putting it into effect.

The question of barter so often applied in Europe where the value is greatly depressed is not required in Holland.

Taxes

The Government taxation system depends almost entirely upon the income tax as a Government source of revenue. The duty on motor cars is normal and only 5 per cent ad valorem. There is a general tendency to increase the taxation, although the luxury tax has at this writing been practically abandoned or delayed for the present, so that it will probably not become a handicap in the immediate future for the importation of motor cars.

No special taxation on foreign companies is levied, and foreign companies have the same rights as native. If located in Holland they are obliged to pay the income tax estimated on the business done in the country. (See my special report on this subject: Incorporation, Branches and Taxation on Companies, Foreign and Domestic, in Holland, dated November 3, 1920.)

Tax on Motor Vehicles

There is no tax on the following vehicles: Automobiles held by public authorities; equipped as ambulances; trucks; those used by manufacturers and dealers in carrying out their business.

All other motor vehicles (excepting motorcycles) are taxed according to value as follows (the selling price of the car is considered as the value):

Less than Fl. 2,000; Fl. 2 for each Fl. 100.

Fl. 2,000 or more, but less than Fl. 4,000; Fl. 40, plus Fl. 2.25, for every Fl. 100 over Fl. 2,000.

Fl. 4,000 or more, but less than Fl. 7,000; Fl. 85, plus Fl. 2.50, for every Fl. 100 over Fl. 4,000.

Fl. 7,000 or more, but less than Fl. 10,000; Fl. 160, plus Fl. 2.75, for every Fl. 100 over Fl. 7,000.

Fl. 10,000 or more; Fl. 242.50, plus Fl. 3, for every Fl. 100 over Fl. 10,000.

Three-wheeled motor vehicles, each, Fl. 15.

When used exclusively for business purposes, the tax is decreased one-half of the above amounts; when used principally for hiring by taxi company or by dealers or manufacturers of motor cars, the tax is decreased to one-quarter of the above amount.

The import duty into Holland on motor vehicles is 5 per cent ad valorem.

The taxation system on motor cars seems to be in a chaotic condition at the present time, 1918 taxes having not been collected as yet.

Agriculture

Holland is primarily an agricultural and dairy farming country; the average farm is about ten acres. There is approximately 1,210,000 hectares (2½ acres 1 hectare) of permanent pasture land and 867,274 hectares under farm crops. Every square foot of available land capable of cultivation has long been carefully utilized by the industrious Dutch farmer.

Live stock is showing a large increase since the armistice and has now approximately reached its pre-war figure, or about 2,400,000 cattle.

Farm labor seems adequate, although there is a tendency on the part of the Dutch farmer to emigrate to America. The farmer is better off than in 1914, having never received such high prices before, and is still maintaining a good price for his products.

There is no rapid increase in the use of farm machinery except where the falling off in labor supply has introduced the installation of some few motor implements. Tractors have not been used to any extent. Because of the low lands in Holland only light tractors can be used, nothing heavier than a Fordson or Samson being practicable.

Transportation

Shipping is adequate; the best ports are Rotterdam and Amsterdam. The first named has direct steamer connection with America, and there are ample facilities for storage for all kinds of goods; free port facilities for goods stored entreport for shipment to other countries can be had at Rotterdam without paying customs duty on goods to be re-exported.

Railroads are equipped to handle shipments direct from warehouses to any European country where reasonably normal conditions exist. The canals, however, play the greatest part in the transportation of freight in the Netherlands.

IN Munich, Germany, hearse service has been "communalized" and will be carried out by means of gasoline automobiles exclusively in the future. Heretofore the service has been partly in the hands of livery men, who furnished horse-drawn hearses, and partly of the city, which owned a number of electric hearses. The change from electric to gasoline hearses was due to the fact that the electrics were about worn out.

Exports of Automobiles and Tires for April, 1921.

COUNTRIES	COMMERCIAL				PASSENGER				Parts	TIRES			All Other Tires
	Complete Cars		Chassis		Complete Cars		Chassis			Casings	Inner	Solid	
Europe													
Azores and Madeira Is.	...	.....	...	.....	1	$ 1,200	...	.....	.....	.....	.....	.....	.....
Belgium	...	.....	30	$ 13,488	33	26,940	...	.....	$ 13,702	.....	.....	.....	.....
Czechoslovakia	...	.....	...	.....	1	600	...	.....	.....	.....	$ 125	.....	.....
Denmark	...	.....	...	.....	14	25,141	...	.....	18,947	$ 10,794	46	.....	.....
Finland	...	.....	6	6,000	3	8,375	...	.....	1,514	1,250	.....	$ 650	.....
France	1	$ 5,564	...	.....	18	45,505	1	$ 360	56,001	203	63	.....	.....
Germany	...	.....	...	.....	7	20,800	...	.....	1,745	.....	.....	.....	358
Gibraltar	...	.....	...	.....	2	2,463	...	.....	37	141	17	.....	.....
Greece	1	1,062	...	.....	7	7,654	...	.....	11,504	1,640	695	.....	.....
Iceland and Faroe Island	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....
Italy	...	.....	...	.....	4	3,949	...	.....	5,640	.....	20	.....	100
Malta, Gozo, and Cyprus Is.	...	.....	...	.....	1	875	...	.....	1,449	2,133	4	.....	.....
Netherlands	7	3,980	4	3,449	24	25,758	...	.....	14,819	2,673	639	.....	.....
Norway	...	.....	...	.....	2	2,650	...	.....	6,834	38,887	1,082	400	.....
Poland and Danzig	...	.....	...	.....	5	8,500	2	600	7,389	530	235	.....	.....
Portugal	...	.....	...	.....	.....	.....	...	.....	2,218	.....	.....	.....	.....
Roumania	...	.....	...	.....	3	12,000	...	.....	.....	.....	.....	.....	.....
Spain	...	.....	...	.....	42	102,027	3	5,560	81,498	46,787	153	350	58
Sweden	...	.....	...	.....	62	71,045	...	.....	5,514	47,773	1,961	2,569	4,913
Switzerland	...	.....	...	.....	3	8,527	...	.....	2,904	1,548	256	.....	.....
Turkey in Europe	...	.....	...	.....	1	605	...	.....	2,843	27	7	.....	.....
England	9	25,088	1	2,940	15	41,322	...	.....	491,656	79,885	8,949	829	.....
Scotland	...	.....	...	.....	.....	.....	...	.....	1,047	.....	.....	.....	.....
Ireland	...	.....	...	.....	.....	.....	...	.....	8,967	.....	.....	.....	.....
Yugoslavia, Albania, et	1	980	...	.....	.....	.....	...	.....	2,399	.....	.....	.....	.....
North and South America													
Bermuda	...	.....	...	.....	.....	.....	...	.....	36	.....	.....	.....	146
British Honduras	...	.....	1	459	2	883	1	375	231	365	146	.....	.....
Canada	87	145,818	140	174,680	807	1,290,067	5	3,765	1,688,126	40,863	3,353	2,163	9,300
Costa Rica	...	.....	...	.....	2	2,227	...	.....	1,774	505	41	.....	115
Guatemala	...	.....	...	.....	.....	.....	...	.....	1,260	1,340	223	.....	.....
Honduras	...	.....	1	450	2	1,421	...	.....	1,467	1,581	428	.....	218
Nicaragua	...	.....	...	.....	1	1,250	...	.....	484	1,437	311	.....	.....
Panama	1	1,550	3	1,514	14	17,562	...	.....	12,965	7,669	1,120	2,408	2,050
Salvador	...	.....	...	.....	.....	.....	...	.....	563	.....	15	.....	.....
Mexico	127	142,936	12	23,361	675	539,484	20	8,000	149,445	135,777	19,808	4,894	2,617
Newfoundland and Labrador	...	.....	...	.....	2	1,372	...	.....	2,098	2,447	358	.....	56
Barbados	...	.....	...	.....	.....	.....	...	.....	1,484	2,012	62	150	.....
Jamaica	...	.....	...	.....	2	2,250	...	.....	2,540	4,636	196	992	.....
Trinidad and Tobago	...	.....	6	4,775	2	2,476	...	.....	5,833	6,796	1,386	1,445	81
Other British West Indies	2	986	...	.....	7	3,398	...	.....	1,016	545	104	.....	.....
Cuba	4	3,987	8	9,899	184	106,542	...	.....	106,690	140,652	9,838	9,402	1,239
Virgin Islands of U. S	2	925	...	.....	3	1,458	...	.....	1,068	512	228	7,582	105
Dutch West Indies	...	.....	1	519	2	1,959	...	.....	1,577	1,077	68	.....	48
French West Indies	...	.....	...	.....	.....	.....	...	.....	2,359	.....	.....	.....	.....
Haiti	...	.....	...	.....	4	1,723	...	.....	1,613	.....	64	.....	.....
Dominican Republic	...	.....	...	.....	17	15,952	...	.....	13,761	12,326	979	.....	57
Argentina	...	.....	...	.....	3	8,250	...	.....	46,903	19,921	4,125	309	3,683
Bolivia	...	.....	...	.....	.....	.....	...	.....	2,079	430	101	.....	.....
Brazil	...	.....	...	.....	5	7,162	...	.....	12,162	5,853	540	776	87
Chile	3	1,559	...	.....	3	5,650	...	.....	17,094	5,918	529	.....	.....
Columbia	...	.....	...	.....	.....	.....	...	.....	4,241	3,869	286	1,546	91
Ecuador	3	11,249	...	.....	3	6,358	...	.....	3,231	1,872	188	.....	.....
British Guiana	2	2,702	...	.....	.....	.....	...	.....	2,130	1,519	18	.....	.....
Dutch Guiana	...	.....	...	.....	.....	.....	...	.....	999	407	83	.....	.....
Paraguay	...	.....	...	.....	.....	.....	...	.....	764	.....	.....	.....	.....
Peru	1	1,853	...	.....	12	30,855	4	1,636	28,276	8,871	2,248	1,195	.....
Uruguay	...	.....	...	.....	2	3,946	...	.....	28,559	5,401	.....	229	.....
Venezuela	...	.....	...	.....	19	17,784	...	.....	20,086	11,648	2,198	97	103
Asia and Far East													
Aden	...	.....	...	.....	.....	.....	...	.....	1,095	.....	.....	.....	.....
China	...	.....	...	.....	2	3,800	17	9,747	5,086	8,601	762	167	.....
Kwantung, leased territory	...	.....	1	1,795	3	9,000	...	.....	142	.....	.....	.....	.....
Chosen	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....
British India	5	14,513	6	17,614	51	78,996	...	.....	21,965	27,198	108	.....	.....
Straits Settlements	...	.....	...	.....	3	3,870	...	.....	12,835	543	150	1,300	697
Other British East Indies	...	.....	...	.....	3	4,239	...	.....	2,567	1,347	30	.....	.....
Dutch East Indies	10	20,231	20	52,569	8	13,980	...	.....	54,543	4,454	2,143	15,442	.....
French Indo China	...	.....	...	.....	.....	.....	...	.....	9,943	287	58	.....	.....
Hongkong	...	.....	...	.....	1	3,500	...	.....	1,124	10,303	523	190	.....
Japan	1	2,249	65	53,694	100	93,124	65	45,189	14,694	8,871	.....	.....	2
Persia	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....
Siam	...	.....	...	.....	.....	.....	...	.....	1,431	2,300	290	.....	.....
Turkey in Asia	1	850	2	7,500	44	26,805	...	.....	11,350	353	118	.....	.....
Australia	2	9,463	12	20,326	16	24,280	34	45,588	63,614	7,250	3,772	821	.....
New Zealand	...	.....	3	6,930	30	40,723	...	.....	32,869	29,357	1,475	6,524	2,112
Other British Oceania	...	.....	...	.....	.....	.....	...	.....	427	1,280	363	.....	.....
French Oceania	...	.....	...	.....	.....	.....	...	.....	523	568	130	138	.....
Other Oceania	...	.....	...	.....	1	650	...	.....	1,041	698	115	.....	.....
Philippine Islands	...	.....	...	.....	3	4,520	...	.....	16,418	14,896	820	3,604	1,163
Africa													
Belgian Kongo	...	.....	...	.....	.....	.....	...	.....	154	.....	.....	.....	.....
British West Africa	...	.....	...	.....	.....	.....	...	.....	14,690	8,691	2,431	.....	.....
British South Africa	...	.....	2	5,093	2	3,600	...	.....	8,910	260	40	1,312	186
British East Africa	...	.....	...	.....	4	3,360	...	.....	316	659	.....	.....	.....
Canary Islands	...	.....	3	1,349	8	3,766	...	.....	1,357	988	.....	.....	.....
Egypt	...	.....	9	4,543	7	2,688	6	1,781	12,363	2,193	149	.....	.....
French Africa	...	.....	...	.....	2	726	...	.....	3,177	.....	84	.....	.....
Kamerun, etc.	...	.....	...	.....	.....	.....	...	.....	458	.....	.....	.....	.....
Liberia	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....	.....
Madagascar	...	.....	...	.....	.....	.....	...	.....	1,040	.....	.....	.....	.....
Morocco	...	.....	3	1,349	2	1,040	...	.....	667	.....	.....	.....	.....
Portuguese Africa	...	.....	...	.....	.....	.....	...	.....	374	.....	.....	.....	.....
Total	270	$397,545	339	$414,296	2,311	$2,808,632	158	$122,601	$3,196,734	$791,617	$77,020	$67,484	$29,585

Steam Cooling

Editor, AUTOMOTIVE INDUSTRIES:

Referring to the interesting article on Mr. Rushmore's cooling system described in AUTOMOTIVE INDUSTRIES of May 26, the writer wishes to mention that early in 1918 he designed a cooling system based on the same principle, which, however, showed a somewhat different mechanical arrangement, as will be seen from the following brief description.

A conventional radiator is modified in such manner that the steam entering from the motor has to follow a certain predetermined path through the entire cooling portion, the water being collected in the bottom tank, from where it is returned by a positive pump in such manner that syphoning back owing to leakage of the pump is impossible.

A water supply tank is provided for the purpose of keeping the water in the motor at a predetermined height in case of loss through leakage or failure of the radiator to condense all steam under extremely unfavorable working conditions.

An adjustable blow-off valve may be provided permitting variation of the temperature, and if located at the outlet of the motor, relieves radiator and hose connections of the pressure against which, however, the pump has to lift the water in this case.

The advantages of this cooling system in comparison with the one developed by Mr. Rushmore are the following ones:

(1) Quicker heating and more uniform temperature of the motor owing to the absence of water circulation at any time.

(2) Assurance that at all times, especially when starting, the jacket is filled with water, which according to the sketch showing the application of Mr. Rushmore's system to a Cadillac car does not seem to be assured.

(3) A still smaller pump can be installed because its capacity has to be sufficient only for returning the maximum quantity of water evaporated by the motor plus a factor of safety, while in Mr. Rushmore's system the pump has to be large enough to fill in short time the jacket which will be empty if the water level in the tank stands below the outlet pipe from the motor.

There is no doubt that cooling by evaporation is one of the most important steps toward increasing the economy of motor vehicles, but in many cases the design of the motor will have to be adapted to the working conditions at a higher average temperature.

Anent the subject of economy, it might be mentioned that previous to working on the cooling system the writer designed a device described below for assuring a dry charge of, as far as possible, uniform temperature, which in connection with the evaporation principle of cooling should materially increase the fuel economy of the conventional motor vehicle engine besides reducing crank case dilution.

To the exhaust manifold of the motor is attached a stove of extra large heating capacity from which hot air is conveyed to the main and auxiliary air inlet of the carbureter; the charge leaving the carbureter passes a thermostat which expands as soon as the temperature of the charge exceeds a predetermined maximum insuring the absence of liquid fuel particles; this expansion opens a valve provided in the hot air line to the carbureter which admits cold air, thereby causing the temperature of the charge to drop.

Preliminary experiments with this latter device gave promising results, but war conditions prevented further development, while the cooling system, for the same reason, did not reach the experimental stage; later on the writer did not have any opportunity for further experiments.

VICTOR JAKOB.

How Trucks Can Be Improved

Editor, AUTOMOTIVE INDUSTRIES:

In reply to your letter of April 27, containing the question, "What do you regard as the next step in truck design to render them more economical and more satisfactory in the hands of the user?"

I am pleased to submit a short discussion on some of the phases of truck development yet to be achieved.

Barring certain engine modifications which may or may not come about as the result of research activity in fuels, it is not stating too much to say that the engine design of trucks has reached a point where the fundamentals are shaken down to a basis of general understanding. We understand the power requirements and the methods of application. We understand the speed requirements and limitations. We are manufacturing trucks of a very high degree of interchangeability of parts, and we are constructing vehicles of great reliability and economy of operation.

To my way of thinking, the next step in truck design is to make them more suited to the requirements of operation and maintenance, and we must improve the design to a point where the parts are easily accessible for repairs, and we must provide cheaper replacement parts in the way of bushings, sleeves and pins at all wearing places, in order to facilitate saving in time and expense in making repairs. This will do away with the replacement of large parts of the vehicle, which are often scrapped, due to the fact that while 95 per cent of the part performs a non-wearing service, the other 5 per cent is subject to wear, and replacement of the entire piece is necessary.

More study is required in reducing the points of lubrication, and facilitating the none too pleasant operation of oiling and greasing of the vehicle.

It is generally recognized that the driver must have reasonable comfort and protection, in order to accomplish the best results. This point is worthy of still further study, as it pays a handsome return on the investment.

In increasing the power and road ability of trucks, it is necessary also to increase the braking ability or stopping ability of motor trucks. It is not only necessary to have enough braking ability to slip the wheels under any conditions, but it is necessary to so arrange the system as to dissipate the enormous amount of energy liberated in the operation of braking. This is particularly true in hilly sections of the country. It calls for a separation of the

braking systems, and the front wheel brakes loom up as a possibility.

The only remaining point has nothing to do with truck design. However, it has everything to do with truck operation in certain lines of work, viz., the development of auxiliary power devices to be used in conjunction with motor trucks. This is an ever widening field, and there is bound to be great development in the years to come.

THE PIERCE-ARROW MOTOR CAR COMPANY,
Francis W. Davis, Consulting Engineer,
Truck Department.

Thermostats in Extremely Cold Weather

Editor, AUTOMOTIVE INDUSTRIES:

In reading Mr. Heldt's article on the cooling system advised by Mr. Rushmore, the writer was somewhat surprised at a statement made to the effect that it is the practice of manufacturers of cars using thermostats to suggest that they be thrown out of operation during very cold weather.

So far as the writer knows, the Cadillac Company was the first company to adopt thermostatic control of the cooling. This company has never recommended that the thermostats be thrown out of operation during cold weather or at any other time, for that matter, except when the cooling system is being filled or drained.

Since the thermostats open the control valves when a predetermined temperature is reached, regardless of the temperature of the atmosphere, there is no reason, in the Cadillac construction at least, why the thermostats should be thrown out of operation.

The writer believes that Mr. Heldt was in error and that this statement should not stand uncorrected.

CADILLAC MOTOR CAR COMPANY,
E. C. Garland, Technical Department.

We were given to understand by our informant that the reason for cutting out the thermostat in extremely cold weather was as follows: If a driver is in a hurry and starts out with his car in zero weather before the thermostatic valve has opened, with the water stationary in the radiator core and the very cold air being forced through it by the motion of the car and drawn through by the fan, it takes but a very short time till the radiator core is frozen solid. This would prevent all circulation when the thermostatic valve opened and might result in serious damage. The fault, of course, would be with the driver, who should know that under such conditions it is not safe to start out before the engine has become warmed up and the thermostat has opened.—ED.

The Next Step in Tractor Design

Editor, AUTOMOTIVE INDUSTRIES:

We believe that there is a real need for a two-plow tractor of such a design as to be a satisfactory unit for drawbar work and belt power, as well as for cultivating. We believe that it is possible to design a machine of this size which will accomplish these three classes of work in a satisfactory manner. In our opinion, it should be a three-speed tractor, with possibly two belt speeds for the different classes of belt work which must be done.

In order to enable this tractor to successfully cultivate or harvest certain row crops, such as potatoes, sugar beets, etc., it would seem necessary that the wheels be adjustable laterally. It should also be possible to couple readily and properly to binders, mowers and similar harvesting machinery, and to belt conveniently to all forms of belt-driven farm machinery. It should be, as nearly as possible, a universal power unit for the small farm, designed to use existing types of farm machinery wherever possible and to eliminate animal power as much as possible.

In our opinion, the design of three- or four-plow tractors should be dictated mainly by the drawbar and belt work which they must perform. More attention should be given to refined design, better materials and more careful workmanship. These same remarks apply to the large tractors used on large grain farms, particularly, and for road-building work.

The track-laying type of tractor must be considered from a different viewpoint, as it is a machine intended to operate under different conditions than a wheel machine is expected to do.

Yours truly,
MINNEAPOLIS STEEL & MACHINERY CO.,
A. W. Scarratt, Automotive Engineer.

Non-Ferrous and Organic Materials

IN connection with aircraft development during the war a great deal of experimental and research work on materials of construction was conducted, and most of the results obtained found their way into the publications of the national advisory committees on aeronautics of Great Britain, the United States and other countries. Aircraft construction makes use of a great variety of materials which while extensively used in other lines previously, had never had to meet such rigid requirements of strength and lightness. These different materials with the exception of steel are dealt with in a book by Arthur W. Judge published by Sir Isaac Pitman & Sons, Ltd. It bears the title of Non-Ferrous and Organic Materials and is the second volume of a set on Aircraft and Automobile Materials of Construction, the first volume of which relates to steels.

The second volume, here under review, covers a great variety of subjects, as follows: Aluminum and its alloys; Copper and its alloys; Bearing metals; Nickel and its alloys; Structure and properties of timber; Testing of timber; Airplane fabrics and coverings; Dopes and varnishes; Glues and gluing; Rubber and its compounds; Paints and painting; Miscellaneous metals and materials; Veneers and plywoods; X-ray method of examining materials. Owing to the great variety of subjects covered they are dealt with in a rather superficial way and the book is generally of an elementary character. It is obvious from the above outline of the subjects covered that aircraft materials are given first consideration, but as most of the metals dealt with are used also in automobile construction their applications in that field are referred to. For instance, in the chapter on Aluminum and its Alloys there are illustrations of cylinder castings, aluminum pistons, a dashboard, etc. Numerous references to sources where more complete information can be found are given throughout the volume.

ACCORDING to a report recently issued by the Dutch Department of Commerce there was a heavy increase in the imports of automobiles and tires into Java and Maduras in 1920 over 1919. There were imported in 1920 1372 motor trucks (621 in 1919), 4448 passenger cars (2470) and 247,663 tires (200,936).

Strength of Labor Lies in Definite Objective of Organization

Employees never forget their text and seldom do they wander far from it, but the employers usually organize for a merely defensive purpose and their objective wanders from meeting to meeting, consequently they never reach a goal. What is written here has many applications.

By Harry Tipper

I HAD a visit from a gentleman the other day who is getting up a new organization of an industrial character. His purpose in visiting me was to find out if I could attend the organizing meeting to suggest to these gentlemen how they can organize. The comment which he made in the course of conversation was very interesting. After visiting one or two associations, he said, "Most of these organizations do not seem to know where they are going. They have no definite object."

May and June are convention months in the business world, and I have had ample opportunity to find out the correctness of this statement.

I have just returned from a convention of approximately two thousand people representing an organization of nearly twenty-four thousand. Among the men who are interested in the development of this organization I heard very little which would indicate that they were moving in a definite direction or had a definite object in front of them.

We have in this country a very large number of business associations and we seem to be confused by the volume of activity in these associations. The volume of activity is not important. The tendency of the movement is important because the movement grows in intensity, not by virtue of the volume of its activity, but by virtue of the definition of its objects.

The power of the trade union to discipline its members, to preserve its characteristics and to influence outsiders is due primarily to the careful definition of its objects. For years the trade union has been moving in a definite direction with a very definite object in front of it.

Even in countries where the trade union itself represents only a small proportion of the working population, the influence of its movement is to be observed in all the discussions upon labor, industrial conditions and the general industrial economics. Even those reactionaries who have refused to see any value in the collective organization of workers have been obliged to take new positions every few years from the pressure of public influence and their own readjustment to outside conditions. Similarly, the definition of the Socialist creed has exerted an influence upon the modern political thinking far beyond the confines of the organization itself and far beyond the liberal elements in the population.

In comparison with these movements the organizations of manufacturers and other employers have developed a great amount of activity with little or no definition of their objects. They have exerted little influence outside of their own membership, and their actions have not affected the political or social thinking to any considerable degree.

Most of these organizations have been started without any definite object other than the protection of the members against the aggression of outsiders. This is the negative and defensive attitude, and these organizations have been obliged to modify their policies, rearrange their objects to meet the new attacks coming from different sources. Taken all in all, the business and professional associations in the United States comprise a membership much larger than the membership of the American Federation of Labor, but as far as their influence is concerned they have no definite common object of any kind, they are moving in no particular direction and their movement does not intensify particularly even after a number of years of action.

The same situation is developing in the discussion of industrial relations. All groups of labor, where they are affiliated with the American Federation of Labor or grouped within the establishment, have two or three definite objects in common. As a rule they do not know how these objects can be obtained most effectively, and they are not in any position to offer a suggested solution of the present problem.

They have indicated the objects, however, and they have suggested the solution they believe to be correct. Because of this definition they have convinced a large part of the working population that the objects are more or less reasonable and the solution more or less valuable.

Professional and industrial associations dealing with the human side are new. They should offer opportunities for the better definition of the human problems of industry and the suggestion of better methods looking to solution.

At present, however, they are floundering around after the manner of so many other associations endeavoring to secure a great volume of activity, discussing and considering matters covering a wide range, and with neither a definite object in front nor a continuing policy of development.

It is interesting to note that it was comparatively easy to secure a unity for the negative object of protection against the aggressions of Germany. That situation produced a larger measure of unity in action and in thought than any other situation since the beginning of the mechanical civilization.

For the positive purpose of peace, however, and reconstruction, we have been unable to preserve even

a decent measure of unity in respect of the most important objects.

An enormous amount of time has been expended in dickering over this or that detail of the matter without success. It is not at all sure that we have elements of peace in the agreements that have been made so far. The same thing is true of the small nations created by the war. They have been a unit in demanding recognition and protection of their racial traditions and associations. That accomplished, they have fallen into the usual political disturbances in attempting a reconstruction program.

It is the same way in business. Men will get together for protection against legislation, for protection against labor troubles, for protection against poor creditors, but in the attempt to throw up a positive program of improvement they fall apart, either becoming negative or split into other associations. It is to be expected that the labor unions of Great Britain, now that they are approaching the responsibility of constructive necessities on account of their great power, will find it impossible to secure the adherence of the millions of workers to any program of construction. The reason for this impossibility of agreement upon constructive measures is obvious. Only a very small percentage of the leaders have definitely examined the situation sufficiently far to build up a program of improvement, and the rest of the population has not even thought beyond the deficiencies.

The improvement can be made, then, only because of the activity and the intensity of the movement of the small minority of any association. **This minority must be prepared to lay down a program within the range of practical possibility to compromise on some of their objects in order to secure a movement in the right direction and to continually force upon the majority the necessity for this development.** They are not liked by associations and they are frequently discredited by the majority who do not understand them. Many of the great English leaders who brought the labor party to its present power died discredited by their own party.

Manufacturers who have been bold enough to experiment in the endeavor to provide a better basis for the co-operation of labor and management are looked upon as fools or denounced as Bolsheviks.

Not much can be expected from the organized associations dealing with the human side of industry; improvements must come from the patience and experimentation undertaken by men who have studied the situation sufficiently to know that they are right, and who are not very careful to receive the plaudits of the general body.

Reinforced Concrete Roads in France

THE use of reinforced concrete as a road material has made its appearance in France and has been experimented with in the city of Lyons with good results.

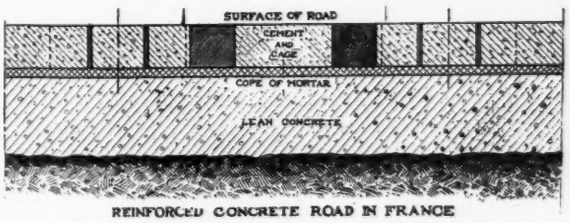
This invention is the property of the Pont-a-Mousson Steel Works, one of the biggest firms in France specializing in iron pipes. A concrete foundation, varying in depth from 4 to 8 inches, according to the amount of traffic to be carried, is first laid and given a surface dressing of fine cement about half an inch in thickness. Before this is quite dry it receives the cast iron reinforcement, the elements of which are roughly square frames 1¾ in. in height with a spur from each corner, and are laid staggered, from 16 to 25 to the square yard, according to the amount of traffic intended to be carried. The base of each cast iron member is slightly reinforced in order to give it a better seating in the cement. Finally a layer of concrete composed of fine Portland cement and quartz chips is laid over the metal reinforcement and carefully tamped down so as not to disturb the elements. When finished the metal is hidden, the road having the appearance of an ordinary concrete highway.

According to the report issued by the road engineer of the city of Lyons, after the road had been in service for six months, during which time it had carried exceptionally heavy traffic, the results are satisfactory. It is stated that the metal reinforcement now slightly projects, but not sufficiently to cause any inconvenience to traffic, and so slightly that for all practical purposes the surface can be considered as perfectly smooth. Water flows off easily and the street is less dusty than others paved with granite blocks.

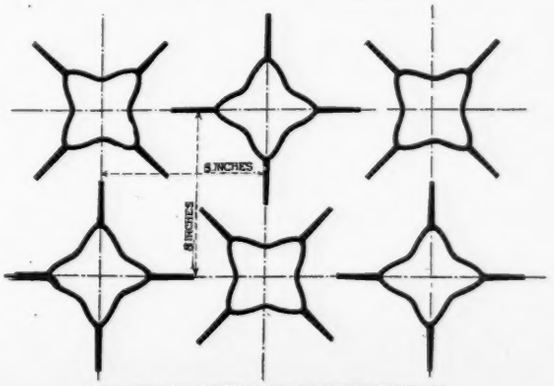
The cost of construction of this experimental road was $5.30 per square metre (nominal exchange), but this was higher than normal, owing to the total inexperience of the workers in this class of road construction. It is estimated that with a little experience cost would be reduced to $5 per square metre, or even less.

Other experiments have been carried out in towns in the east of France, where reinforced concrete roads have been in use for nine years. It is found that with the correct mixture of surface dressing there is only a very slight tendency, and after a long period, for the cast iron members to project above the surrounding surface, and even when considerable wear has taken place there is no inconvenience to vehicular traffic.

The cost of construction on a pre-war basis is given by the Pont-a-Mousson Steel Works as $3.80 per square metre for their reinforced concrete road, compared with $4.45 for asphalt, $4.46 for wood blocks, $4.77 for granite blocks on sand, and $5.32 for granite blocks on concrete. One of the main advantages claimed for the reinforced concrete road is that maintainance costs are practically nil, whereas wood paving blocks cost as high as 42 cents per square metre per annum.



REINFORCED CONCRETE ROAD IN FRANCE



SPACING OF CAST IRON REINFORCEMENTS FOR HEAVY TRAFFIC ROAD

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE
Reg. U. S. Pat. Off.

PUBLISHED WEEKLY

Vol. XLIV Thursday, June 23, 1921 No. 25

THE CLASS JOURNAL COMPANY
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To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; A. C. Pearson, Treasurer; Fritz J. Frank, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly) July, 1907.

Management's Responsibility to the Salesman

A NUMBER of sales managers were asked this question recently by St. Elmo Lewis: "What one thing can the salesman do to overcome the present sales resistance?" Many of the answers were interesting, but that given by F. M. Manning, director of sales, Diamond Match Company, bears an especially pertinent message to the manufacturer at this time. He said:

"I would like to throw this thought into your question: 'What is the house doing to make it possible for good individual sales effort to accomplish results?'

"Too many of us unconsciously regard the salesman as the creator, gatherer and finder of our business. . . . And when we need more business we usually start to 'stimulate' the salesman.

"We owe the salesman a product, a price and a proposition which will be successful if the salesman presents it properly to the prospect. I think there is a tendency to under-estimate the responsibility of the management and to over-estimate the responsibility of the salesman.

"Therefore, we should ask ourselves the question, 'What are we doing to make it possible for the salesman to overcome the present sales resistance?' "

This attitude on the part of the management will produce results. The problem is not to find reasons for lack of sales, but to find ways of making sales. "Passing the buck" may excuse the individual, but it will not sell cars and trucks.

The recent trend of prices and production methods indicate that the automobile manufacturer has realized his share of the responsibility and that he is facing the issue squarely.

We Have the Power

THE recent reports of the Bureau of Census have established the automotive industry clearly as ranking second in value of a finished product.

This classification is interesting, especially so in that it supplies a key as to the position the industry should take in the business world. The industry is new and it has been the victim of many and varied opinions within its own ranks. But there is nothing like a touch of adversity to bring people together. A man and wife may fight each other, but in nine cases out of ten when the outsider attempts to take part in the fight, both will turn on him.

During the last winter many differences of opinion were buried under snow drifts. The industry is reaching a common viewpoint as to what is good for it. Just now there are several points of general interest before the public, especially the political public and each member of the industry should use his own political power to promote the best interests of his own industry. Each member of the industry has political power, and so has his wife. Among the ideas that need promotion are:

The Townsend bill that has been reported favorably by the Senate.

A reasonable tax law by Congress.

A drastic curtailment of Federal expenses.

A just recognition of business by Government.

Legislators and other government officials are merely human, after all. They frequently will move in the line of least resistance. Many industries are better organized for promotion of self interest that the automotive industry and, consequently, get more recognition. We believe the position taken by the automotive industry on these public questions has been the position for the greatest good to the greatest number, and each member of the industry should do all in his power to promote the common platform.

An Inventory As a Liability

IN a recent speech before a gathering of business paper editors George M. Graham asked permission to tell a short story, illustrating a point about inventories, before he began his real talk of the evening. His story was, in effect, as follows:

"This morning I arrived in New York at 9 o'clock

wearing a straw hat and found that it was raining. The rain continued to fall all day and as I moved about the city making calls, I employed taxicabs, primarily to protect that straw hat. When I had finished the day, I found that if I had started the day by throwing that straw hat under a truck and had bought a cap I would have been several dollars ahead. I am suggesting this, merely to present the view that sometimes an inventory can be a liability instead of an asset."

It would be interesting to know how many automotive concerns have made the inventory of a year ago a liability by protecting it with high sales prices.

Motorcycle Activities Abroad

ALL of the European countries which participated in the war are more or less impoverished, and, to judge by current exchange rates, the European neutrals are in a not much better position. This condition is being reflected by the demand for motor vehicles in the different countries. There is great need for motor transportation by reason of the inadequate railway services, due to different causes. The war, with its intensive industrial activity, brought home the advantages of quick travel, and the only thing that stands in the way of heavy motor car sales in Europe is the economic situation.

Speaking in general terms, Europe wants the quick transportation which the motor vehicle makes possible, but cannot afford the expense which generally goes with the touring type of car, the sport runabout or speedster. It is, therefore, natural that it should turn to the most economical type of motor vehicle known, the motorcycle. There has been a greatly stimulated interest in motorcycles in all the large European countries since the war, most of all, perhaps, in Germany. Motor vehicles are increasingly used for business purposes, and in practical work it is seldom that more than one or two persons need to be carried at a time. The motorcycle with side car provides transportation for up to three persons, and therefore meets the practical requirements of a great many people. Its economy is the result of its low weight and relatively simple construction.

In Germany the development has run to a certain extent in the direction of fitting ordinary pedal cycles with gasoline engines and driving means. It is hardly necessary to point out that this line gives very little promise of success, because a framework and wheels designed for the restricted weight and power of the rider quickly goes to pieces when subjected to the additional weight and power of a mechanical engine. The conversion plan, of course, appeals to the man who owns a bicycle, since the outlay required is very much less than that for a new motorcycle. But it is not very likely that the popularity of converted pedal bicycles will outlive the reconstruction period.

There is evidence of much thoughtful development work being done on motorcycles throughout Europe. The pressed steel frame, for instance, has made its appearance in a number of rather attractive and promising designs. By the use of pressed steel the designers may succeed in solving the problem of protecting the rider from mud and dust. Spring suspension is also receiving much attention, and this may result in a material increase in riding comfort. A large market for motorcycles in Europe is practically assured for the next several years, and technical developments will undoubtedly be commensurate with commercial activity.

A Notable Victory for the Straight Side Tire.

OWING to the fact that there is a large international trade in automobile tires and that tire renewals must be provided for cars extending through a number of countries, it is hardly conceivable that the present double standard of tire design will be maintained; that is, that both the straight side and the clincher tire will continue to be made in all sizes. The recent agitation against the straight side tire in France has brought the matter to a head, and it seems that there will be from now on persistent rivalry for supremacy. In contrast to the leading French tire manufacturer, a number of the smaller French makers have taken a favorable attitude toward the straight side tire, and one or two have even decided to manufacture it.

The greatest accession of strength to the ranks of the straight side protagonists, however, has been that of the Dunlop Rubber Co. of Great Britain, which has reached the conclusion that the straight side tire has a balance of advantages over the clincher type, especially in the larger sizes, and its chief product hereafter will be straight side, cord passenger car tires. The conversion of the Dunlop company to the straight side principle for automobile tires is particularly significant, because the design of the straight side tire is based on that of the Dunlop type of bicycle tire.

Little Manifold Heating in Europe

EUROPEAN engineers have not gone nearly so far as we have in the matter of applying heat to the incoming charge, as is evident from the article on manifolds by Messrs. Bradley and Gerster in this issue and from descriptions of European cars that have recently reached us. This may be in part accounted for by the fact that none of the large European industrial countries has the low winter temperatures that we have to contend with, but the chief reason undoubtedly is that the gasoline sold in Europe at the present time does not have the low end point that ours has. As compared with the United States, the number of automobiles in use in the different European states is comparatively small, and the demand for gasoline there does not bear the same proportion to the demand for other petroleum products that it does here, hence there is not the same temptation to convert as much as possible of the crude into gasoline. As a result, European engineers are now using about the same vaporizing and distributing devices that we used about two years ago.

June Sales Prove Gloom Untimely

New York Business Far Ahead of May

Price Reductions Start Rally Which Is Continuing Strong —Registrations Swamped

NEW YORK, June 18—Spurred by price reductions which seem to have convinced at least part of the public that automobile prices have at last been stabilized and by ideal June weather, passenger car sales in the Metropolitan territory since June 1 have run far ahead of May business, which in turn was 727 cars ahead of April.

Actual figures on June sales will not be available until the end of the month, owing to lack of daily compilation of figures in the Motor Vehicle Department, but reports from Albany show that there has been a veritable avalanche of registrations.

May registrations for ten counties in and around New York, just compiled, show a gain of 727 over April. This in itself is an illuminating commentary on the effect of substantial reductions. April had been a big month, for April, sales having been stimulated by the early spring. May started off poorly and indications at the end of two weeks were that the April total would not be reached. However, following the lead of Marmon and Jordan, price reductions followed each other rapidly throughout the month and by the fifteenth sales were running far ahead of the daily record of April and the final report showed that the last half of May had splendidly offset the slump of the first two weeks when two or three price reductions not immediately followed by manufacturers generally left the public in a state of confusion wherein purchasing was scant.

All Classes Find Buyers

An interesting study of passenger car registrations, which are equivalent to deliveries, is made possible through information contained in the Automobile Sales Analysis published monthly by Sherlock & Arnold and patronized by most of the metropolitan dealers. According to this report, registrations in ten counties in and around New York for the first five months of the year were as follows:

	$3000 and Up	Under $3000	Total
January	101	470	571
February	185	1383	1568
March	385	2919	3304
April	561	4749	5310
May	579	5458	6037

ALL COMPANIES SHARE IN HARVEST OF SALES

NEW YORK, June 21—Retail sales of automobiles in all sections of the country promise to surpass this month the record set for April and the volume of business will be materially greater than in May. The greatest sales harvest is being enjoyed by the companies which have made substantial price cuts, but it is reflected all along the line, and companies which have not made reductions are sharing.

Reports on sales conditions, gathered by correspondents of AUTOMOTIVE INDUSTRIES in distribution centers, all show that almost without exception June business is running ahead of the last two months. This seems to be true particularly in the New York and Chicago territories.

Manufacturers who were deeply pessimistic at the end of May now admit that the outlook is brighter and a considerable number declare that the orders on hand will carry their plants through the middle of July on the present production schedule.

The Goodyear Tire & Rubber Co., which announced a short time ago that the automotive industry was due for another slump and prepared many of its employees for a lay-off, has been compelled to recast its plans. There will be no curtailment of production, and there will be no extended vacation for "inventory."

The outlook, as forecast in AUTOMOTIVE INDUSTRIES of last week, is distinctly encouraging. Sales probably will slow up in July and August, but there is every reason to believe there will be a renewal of interest and a resumption of buying with the coming of September.

Detroit Sales Jump

DETROIT, June 18—Dealers handling cars on which prices have been cut, report increases in business in the last 10 days ranging from 100 per cent to 1500 per cent. On the other hand, dealers handling cars on which no cuts have been announced are not having this increase. G. O. Simons, Overland and Knight distributor, reports an increase of 200 per cent. T. J. Doyle, Dodge, reports an increase of 1500 per cent.

Best Month of Year in Chicago Opinion

Price Cut Lines Lead in Demand But All Dealers Get Share— General Outlook Good

CHICAGO, June 18—Automobile dealers in this city are almost a unit in declaring that business for June is better than for April or May. Naturally the largest business is being done by those lines which have made substantial price cuts but conditions are by no means discouraging even for dealers whose companies are standing pat on prices. Collections are good and most dealers are satisfied with the outlook for the future although they expect that there will be the usual slump in sales the last half of July and August.

Oakland sales in May were the largest in seven years, showing an increase of 175 per cent over April and the indications are that June will be as good as May. Prospects are numerous and the outlook is bright.

June sales of Oldsmobile are not as good as in April or May but the volume of business thus far in 1921 has been better than in 1920 up to June.

Overland reports a 500 per cent sales increase over April and May and already has delivered as many cars this month as in any previous month. Cash is being paid for many of the cars.

June business for Franklin will show an increase over May. Sales for 1921 have been away ahead of the first 5½ months of 1920. Collections are good.

Dodge sold as many cars the week following the price cut as ordinarily would be disposed of in two months.

Briscoe Reports Gains

Although there has been no cut in price by Briscoe, sales have increased in the last two weeks and are much better than in May or April.

June is running better than April or May for Buick than all three months last year. The Chicago company has received a consignment of 500 cars and expects to clean them out in the near future.

Other companies which report that June business is better than April or May include Mitchell, Gardner, Lexington, Hudson and Essex.

Those which say that June is equal to that of either April or May include National, Packard, Haynes, Allen, Sayers, Handley-Knight, Stevens-Duryea, Pierce-Arrow and Peerless.

Reports on Business Conditions Continued on Page 1401

Buick Re-enters Automobile Field

Pioneer Named Head of Lorraine Motors

Will Make New Car at Grand Rapids Plant—Amassed Fortune With First Product

DETROIT, June 20—David Buick of Detroit, founder of the Buick Motor Co. of Flint, has re-entered the automobile business as head of the Lorraine Motors Corp. of Grand Rapids, and has designed a new car which will be put on the market shortly. The car will be marketed as the Lorraine, although it will be an entirely different product from that which the Grand Rapids organization has been manufacturing.

Buick and his associates have secured a controlling interest in the Lorraine Motors Corp. and a strong organization already has been perfected. A. H. Wyatt, well known in automotive and financial circles in Michigan, will be associated with Buick, in addition to John J. Larkin, former sales manager of the Haynes Automobile Co. of Kokomo, Ind., who will be general sales manager, and William Hulin of Grand Rapids.

The new car, which, it is promised, will rank with the higher priced cars in body design, will sell for less than $1,200, according to an official of the company. It will be equipped with a valve-in-head engine. Buick being credited with having brought out the first engine of that type.

Since leaving the Buick organization, although interested chiefly in carbureter production, Buick has continued to experiment with engines, and the one installed in the new Lorraine is declared to include several new features. The new car will have a 115-in. wheel base and will be equipped with a carburetion system thoroughly tried and tested under Buick's direction. The first car is being assembled and will be shown at Grand Rapids within a few weeks.

Buick left the company which bears his name in 1909, after six years spent in developing it, during which time he and his associates amassed fortunes. The Buick Co. was started with a capital of $37,000, and stockholders were made wealthy when the General Motors organization was formed with Buick as a central company.

R. A. A. BACKS TOWNSEND BILL

NEW YORK, June 20—Joining forces with the National Automobile Chamber of Commerce and the Rubber Association of America, the Motor and Accessory Manufacturers Association, has sent to its members a bulletin in which it declares that the United States highway policy has reached the cross-roads and that Congress must decide whether it will adopt President Harding's recommendation for a Federal highway commission as proposed in the Townsend bill, or let things drift. The bulletin states that to eliminate the plan for a Federal highway commission, as suggested in other legislation introduced in opposition to the Townsend bill would be to rob America's new road policy of its essential strength and efficiency.

Makers and Dealers Meet Again June 30

NEW YORK, June 20—The second of the series of conferences between committees representing the National Automobile Chamber of Commerce and the National Automobile Dealers' Association will be held June 30 at the Detroit Athletic Club. William E. Metzger has been appointed chairman of the N.A.C.C. committee which was headed by W. C. Sills of the General Motors Corp., until he retired from the Chevrolet company to become distributor for the New England territory. While Metzger is a vice-president and a large stockholder of the Columbia Motors Co. he looks upon the problems of the dealer from a sympathetic viewpoint for the reason that he is a member of the company which distributes the Willys-St. Claire car in Detroit.

Employment in May Shows 4.4 Per Cent Gain

WASHINGTON, June 20 — Employment figures for the month of May compiled by the Bureau of Labor Statistics showed that there was an increase of 4.4 per cent in the number of men employed in the 46 automobile plants from which reports were received. The number of employees in April was 83,566 and last month it was 87,266. The number of employees in May, 1920, was 128,982.

In its discussion of the automotive industry, the report says:

"In this industry market conditions have improved since April and the per capita earnings show an increase of 4.9 per cent when comparing April and May figures."

The only other industries which showed an increase in employment for May over April were cotton manufacturing, cotton finishing, hosiery and underwear, woolen, leather and boots and shoes.

WHITE WINS TAX DECISION

CLEVELAND, June 20—In a decision handed down in Common Pleas Court this week by Judge Manuel Levine, the White Motor Co. was adjudged within the Ohio personal property tax law in deducting its Federal tax due from its total credits.

Goodyear Cuts Price On All Truck Tires

Reductions Range from 10 Per Cent on Cushion Tires to 23½ on Pneumatics

AKRON, June 20.—The Goodyear Tire & Rubber Co. has made sweeping price cuts on all motor truck tires, including both solids and pneumatics and also cushion truck tires, effective to-day. The Goodyear price cuts will average 23½ per cent on all six, seven and eight inch cord pneumatic truck tires, including the sizes most generally used on trucks and buses. Reductions on all Goodyear S V solid tires will average 12 per cent and on cushion tires the cut will average 10 per cent. Prices on pneumatic tires for trucks over eight inches and on the new all weather solid tires for trucks will also be reduced to some extent.

Goodyear is the first major tire company in the United States to announce price reductions on truck tires. Practically all companies have reduced automobile tire prices, but none outside of Goodyear so far as revised prices on pneumatic and solid motor truck tires.

"These reductions will complete the stabilization of tire prices through the entire Goodyear line, following the reduction in prices on all kinds of automobile casings and tubes announced last month," says a Goodyear statement on the subject.

Goodyear to-day recalled 1200 of the tire builders who were laid off several weeks ago. Goodyear has completely revised its announced plans for closing down the factories from June 24 to July 5 for semi-annual inventory and will keep most departments running through that period, closing them only long enough for a hurried invoice. The steady increase in dealers' orders makes necessary the rehiring of several hundred men, officials state.

Dealers' Orders Increase

Three weeks ago Goodyear announced the tire industry apparently had entered a new slump. This, it was said, had been brought about by automobile manufacturers reducing their original equipment specifications. Dealers' orders have continued to increase, however, and Goodyear reports its dealer business now will compare favorably with normal dealer business for any time in the company's history.

Goodyear declares the increase in dealers' business does not assume the phase of a spurt, but justifies the belief that business will hold up in a stabilized way and will warrant putting on more men and increasing production.

Body Makers Discuss Needs of Industry

Credits, Contracts and Inventories Considered at Detroit Convention

DETROIT, June 18—Unethical practices of customers, labor problems and wage adjustments, liquidation of inventories, raw material prices and problems of financing occupied the time of the members of the Automobile Body Builders' Association at the convention which closed yesterday.

In opening the convention, following the meeting of the executive committee Thursday morning, President E. J. Thompson, of the E. J. Thompson Co. of Philadelphia, announced that no set program had been fixed, the conditions existing in the industry at this time calling for intimate discussions and the viewpoints of all present rather than the usual addresses dealing with generalities. On account of the vital problems confronting the association and the intimate questions to be taken up, he asked for an expression regarding the advisability of a closed session, and upon motion of A. R. Guider of Detroit, the 30 members present voted to exclude all but members and a few manufacturers "invited" to participate in the sessions.

A great portion of the discussion, officials said after the meeting, centered on problems of finance. Experiences of the members in satisfying their banking connections were heard and suggestions offered for closer relation with the financiers and a spirit of more hearty co-operation in furnishing them every bit of information on which to base credit. Methods of emergency fianancing—where to get money and how to make the most of a firm's capital, also were dwelt upon at length. Chief interest, however, centered in the matter of frankness with the banker as certain to assure extension of credit where deserved.

Find Practices Unfair

The cancellation of contracts by customers and the question of past due accounts came in for serious consideration, and practices that were declared to be most unfair were shown by members in detailing their various experiences. Questions of how best to overcome the evil and the formulation of a definite policy were discussed, but no formal action taken.

The matter of uniform sales contracts also was brought up and much time was consumed on the question of establishment of repair agencies throughout the country. Bad paint jobs, due to various causes other than poor material or inefficient workmanship, brought forth much discussion and suggestions for remedies.

The liquidation of inventories was urged as the all-important question before the association, and this brought to the front the problem of prices of raw materials now as compared with last fall, and the effect of those prices on production and sales costs. Standardization of materials and the extent to which raw material manufacturers will go in financing body builders, also were discussed.

Cost of production and the influence of present labor and wage conditions were gone into, and while it was the consensus that labor efficiency has increased more than 50 per cent, further wage recessions to meet demand for reduced prices were held imperative. Problems of administration as affecting the production end also were taken up.

Members of the association following the meeting said the time was spent almost wholly in discussions, and no action of definite nature taken on any of the many problems brought out.

Legislative Activity Important, Says Graham

NEW YORK, June 17—George M. Graham, vice-president and sales manager of the Pierce-Arrow Motor Car Co., was the principal speaker of the evening at a dinner of the New York Conference of Business Paper Editors. Speaking on business, its obligations and opportunities, Graham cited some illuminating facts about the tremendous wealth of the United States, as compared with its indebtedness. He showed that indebtedness is $24,000,000,000, from which $10,000,000,000 may be subtracted as representing our loans to the Allies, while the national wealth is at least $225,000,000,000 and, in the opinion of some authorities, $350,000,000,000. Graham observed that the United States decidedly was a "going concern."

Graham declared that business must be constantly alert to present its case correctly before government authorities, citing the recent effort of the automotive industry to bring about reduction or at least prevent increase of "stigma" taxes and pointing out the surprise of Senators and Representatives when they were shown for the first time, the essential nature of the industry. Business would suffer less from discriminatory legislation, the speaker said, if it would take the pains at all times to make sure that the public and officials understood its motives and accomplishments.

OHIO STARTS IMPORTANT ROAD

YOUNGSTOWN, OHIO, June 21—Work has been started on one of the most difficult and important highway jobs in the State in Wayne, Ashland and Knox counties. It will bring this city into closer touch with Columbus and Cincinnati, and the road will be an important link in the Lincoln highway. The estimated cost is $2,250,000. It is expected that all the 48 tractors owned by the State will be used as well as 75 more trucks and a dozen large steam shovels. State Highway Commissioner Herrick will have personal charge of the work and Major Adolf Stellhorn, highway department engineer, will be second in command.

Reserve Board Bans Import Parts Loans

Holds Goods Not Readily Marketable Within Meaning of Federal Act

WASHINGTON, June 18.—According to an opinion expresed by the Federal Reserve Board here to-day, renewal acceptances to finance the subsequent storage and resale of automobile parts imported from France are ineligible for acceptance by national banks. The Board was advised that "a national bank makes acceptances covering the importation of automobile parts from France, with a maturity of 90 days, which is supposed to be sufficient to cover payment for the merchandise in France, its transit to New York, its warehousing, and subsequent sale from warehouse. It is found, however, that before the transaction has been completed by the sale of the merchandise, that the 90-day period has expired."

In reviewing the case, the Board said that it appeared from the letter that the importer was drawer of the original drafts and was to be the drawer of the renewal drafts and that at the maturity of the original acceptances the parts had already arrived in the United States and were stored in warehouses pending resale by the importer.

It was said that section 13 of the Federal Reserve Act does not confer authority upon national banks to accept drafts growing out of the storage of goods other than "readily marketable staples," and automobile parts cannot be regarded as readily marketable staples within the meaning of this section. Consequently, if the drafts are to be secured by warehouse receipts covering the automobile parts, that fact would not of itself make the drafts eligible for acceptance by national banks. The drafts are eligible for acceptance only if and upon the ground that they can be said to grow out of the importation of the automobile parts within the intent of section 13.

McSHERRY IN RECEIVERSHIP

SPRINGFIELD, Ill., June 17—Alleging that the McSherry Mfg. Co. has liabilities exceeding $175,000, L. N. Rosenbaum, of New York City, filed a petition for receivership to protect his credits of $27,000. Judge E. S. Smith has named Joseph F. Bunn and E. H. Holbrook receivers. The petition sets forth that under the receivership, the firm with $400,000 assets will be able to meet its creditors. Capital stock is $1,400,000.

JOIN MOTOR TRUCK MAKERS

CHICAGO, June 18—The Atterbury Motor Car Co., Buffalo; the Federal Motor Truck Co., Detroit; the Selden Truck Corp., Rochester, and the Stewart Motor Truck Corp., Buffalo, recently have become members of the Motor Truck Manufacturers' Association.

Endurance, Economy; Most Sought in Car

N. A. C. C. Poll Shows Price Consideration Ranking Fourth—Speed Little Sought

ATLANTA, June 18—"Endurance is the most popular, and economy the second favored feature of the motor car, according to a nation-wide poll of motorists," said J. C. Long of the National Automobile Chamber of Commerce, speaking before the Associated Advertising Clubs of the World in session here.

"Comfort is the third consideration, followed by price. Speed and distinctive refinements have little interest for the average purchaser.

"These conclusions are the compiled returns from question cards sent to car owners in all sections of the United States by the National Automobile Chamber of Commerce, asking motorists to express their relative preference concerning the following features of a car: Appearance (general), appointments, comfort, economy, indorsement of other owners, endurance, flexibility, hill climbing, price, service (good local repair shops), specifications, speed."

"Buying points," said Long, "rather than selling points, are the important considerations to-day; and this poll of the customer should prove a helpful guide to both engineer and advertiser.

"Returns from 20 States, covering more than 30 makes of cars, on the index basis of 100 give the following emphasis to the different buying points:

Endurance 15; economy 14; comfort 9½; price 9½; appearance 8; service 7½; hill climbing 7; flexibility 6½; endorsement of others 6½; specifications 6; speed 5½; appointments 5.

"Fifty-one per cent of the voters said they were not interested in slogans. Forty per cent did not comment on this point, and of the remaining 9 per cent many specified that they were interested in lines which referred to motor transport in general, such as 'Drive Carefully.'

"Twenty-three per cent of this poll expressed an interest in specially featured parts, such as motors and springs, but 48 per cent were not interested, and 29 per cent were non-committal."

REES BUYS ATTICA PLANT

COLUMBUS, June 21—The Rees Motor Co. has purchased the plant of the Halladay Motors Corp. at Attica, Halladay having moved to Newark, Ohio, and it is the intention of the Rees organization to build a four-cylinder passenger car to sell for $1,450. The bore will be 2¾ in. and stroke 5⅛ in. Ignition will be by Atwater Kent system and the starting and lighting, Dyneto.

PAIGE ADDS DAYTONA ROADSTER

DETROIT, June 18—Following the record made at Daytona by the Paige 6-66, the Paige-Detroit Motor Car Co., has added a new body to the line on that chassis, this to be called the Daytona Roadster. It is primarily a sportsman's job but the skeleton equipment ordinarily found on racy-type models is replaced with comfortable seats and equipment. There is an auxiliary seat on the side of the body with foot rest on the aluminum step. Wheels are wire with 33x4½ cord tires. The finish is deep red for the body, wheels enameled in blue and other running gear black. Other equipment includes bullet side lamps, cowl ventilator, safety latches on doors, electric clock and muffler cutout.

Lexington Cuts Prices $200 to $600 on Line

CONNERSVILLE, IND., June 20—Reductions in the prices of its cars were made to-day by the Lexington Motor Co. The reductions, ranging from $200 to $600, will be effective immediately. They cover all Series "S" and Series "T" models, the former being equipped with Continental motors and the latter with the Ansted engine which was used in the Lexington specials that won both first and second honors in the two major events at the Pikes Peak hill climb last Labor Day.

Comparative table of new and old prices follows:

Models	New	Old
"S" Touring Car	$1865	$2285
"S" Thorobred	1985	2285
"S" Lex-Sedan	2185	2785
"S" Coupe	2750	3250
"S" Sedan	3150	3350
"T" Touring Car	2785	2985
"T" Sedanette	3750	4150

Martin-Parry Reduces Prices on Ford Bodies

NEW YORK, June 20—The Martin-Parry Corp., manufacturers of light commercial bodies with plants at York, Pa. and Indianapolis, has made another reduction in the prices of commercial and farm bodies for Fords. This reduction amounts to 10 per cent on certain models and became effective to-day. The Martin - Parry factories are operating on a good volume of production and officers of the corporation are confident that the business of their dealers and branches will be stimulated by this price revision.

STANLEY MAKES BIG CUT

BOSTON, June 16—The Stanley Motor Carriage Co. of Newton announces a cut in prices of all models of the Stanley car, the reduction averaging 33⅓ per cent. The reduction on the open models announced to-day is $1350 and follows a cut of $925 which was made last October.

PAN AMERICAN PRICE CUT

DECATUR, ILL., June 20—Prices on Pan-American cars have been reduced $250, the new prices to become effective at once. Both the roadster and touring car are now priced at $2,000.

Many New Models to Make Fall Bow

Era of Keen Competition Seen in Efforts to Induce Sales—G. M. C. Lines Active

NEW YORK, June 20—Much interest is being manifested in the industry in the unusually large number of new models which will be brought out in the late summer or early fall. They presage a new era of keen competition which close observers believe will give a new stimulus to the automotive trade. These new models are evidence that the manufacturers do not propose to depend entirely upon price inducements to get business.

The General Motors Corp. will be particularly active in the presentation of new models this year, and they will take in practically all the General Motors lines, including Cadillac, Oldsmoble, Scripps-Booth and Buick.

There is much speculation concerning the Durant line, which will be put on the market in the fall. The Durant four cylinder car has been promised for Aug. 1. Preliminary work on it has been completed and persons who have seen the car declare it a very high class job for the price at which it will sell.

The Sheridan, which recently was purchased from the General Motors Corp., will be converted into a six cylinder instead of a four. Experimental work on it is now under way at Long Island City. Except for the engine, the car will be practically the same as at present.

Experimental work on the Collins car now is being carried on in Detroit by R. H. Collins. The car will be developed along lines of his own and he will be given a free hand by Durant.

Reports from Detroit are to the effect that orders for the Lincoln car are coming in faster than they can be filled. The plants had considerable difficulty in finally getting under way, but now that business actually has been given a substantial start, the car is creating something of a sensation.

The new Chrysler six which will be turned out at the big new plant of the Willys Corp. at Elizabeth probably will be put on the market in the late fall. It is understood that experimental work on it has been virtually completed and that it is entirely satisfactory to the Willys organization.

SARLES DUESENBERG WINS

GERMANTOWN, Pa., June 18—Roscoe Sarles, driving a Duesenberg car, won the 225 mile trophy race at the Uniontown speedway to-day. He averaged 97.75 miles an hour. Eddie Hearne, in a Revere Special, was second. His average was 97.25 miles an hour. Eddie Miller in a Duesenberg was third; Tom Alley in a Frontenac fourth; Alton Soules in a Frontenac Special fifth; Jimmie Murphy in a Duesenberg sixth; Frank Elliott in a Leach Special seventh, and Tommy Milton in a Frontenac eighth.

Buick Extends Work to Meet Heavy Sale

Production Now Over 250 Daily —Expect Steady Operation Through Winter

DETROIT, June 18—Orders are coming in from all sections of the country in good volume according to Buick Motor Co. officials. As a result production has been increased slightly and General Sales Manager E. D. Strong said today the plant now was hitting better than 250 daily. This is slightly in excess of the output for the past two months which ranged between 200 and 250. A driveaway of 500 cars destined to the Chicago dealers left the Buick factory Wednesday.

More than 11,000 employees now are at work in the Buick factory, according to President Bassett, and the factory is operating practically on a normal time schedule. Demand for cars has taken a decided leap, President Bassett said, and in increasing production it will be the policy to increase the working hours rather than add men to the force.

Despite the sharp jump in the sales demand, Buick officials are not to be stampeded and Sales Manager Strong said production at all times would be strictly in conformity with demand. "We are going to continue operation under this plan of building and we expect to be working next winter as steadily as we are to-day," said Strong.

Cars for all adjacent cities are being driven away from the factory, but the more distant points are being served by the railways. On Wednesday, the same day the 500 cars left overland for Chicago, a shipment of 300 was sent out by train to eastern dealers.

While all of the factories which have announced price cuts have reported increases in orders, the few which did not join in the price slash also declare that they are experiencing good business right now.

Ford Sales on Coast Run Far Ahead of 1920

PORTLAND, ORE., June 18—Nearly 50 per cent more new Ford cars were sold in the city of Portland during the period from Jan. 1 to May 20 this year than during the same period of last year. In that time a total of 1212 new Fords were delivered by the Ford factory branch to the six authorized retail Ford dealers of this city. The Ford branch is now 355 cars behind.

Last year, for the same period, 851 Ford cars were delivered, this spring's business showing an increase over last of 361 cars, or an increase of about 40 per cent. Sales throughout the entire state of Oregon show a distinct increase for the Ford this year. Taking the state as a whole each month from January to June has shown an increase of from 40 to 62 per cent.

WAGON MAKING DROPS TO HALF 1914 TOTAL

WASHINGTON, June 18—A preliminary statement of the 1920 census of manufactures with reference to the manufacture of carriages and wagons, together with the materials used in the production of the completed vehicles, shows that the number of establishments engaged in this industry is rapidly decreasing. Reports were received from only 2666 in 1919, as compared with 5286 in 1914. The number of vehicles manufactured in 1919 was 695,200, valued at $66,083,000, as compared with 1,177,400 valued at $72,284,000 in 1914. The decline in the industry is due almost exclusively to the increasing use of passenger automobiles and motor trucks.

Vim Truck Operating on 14 a Day Basis

PHILADELPHIA, June 18—Formal announcement is now made by the Vim Motor Truck Co. that it has been taken over by the Standard Steel Car Co. of Pittsburgh and is now being operated as a subsidiary of that concern.

Harold B. Larzelere, vice-president and general manager of the Vim Motor Truck Co., will continue in that office. He says that the plant is now working at about 20 per cent of capacity and producing 14 trucks a day.

The Standard Steel Car Co. manufactures steel cars and automobiles and, in addition to its interests in the Vim company, controls the Middletown Car Co. and the Baltimore Car & Foundry Co. John M. Hansen, the president, is also a director and a member of the executive committee of the Baldwin Locomotive Works.

ONEIDA INCREASES OUTPUT

GREEN BAY, WIS., June 18—The Oneida Motor Truck Co. resumed operations on June 6 on a production schedule of 30 to 50 trucks per month, with a working force of about 60 per cent of the normal prior to the shutdown several months ago. Shortly after Jan. 1 it was found necessary because of business conditions to reduce the force 75 per cent or more. New business booked during the last six to eight weeks and orders for future delivery have enabled a resumption.

DUPLEX EXTENDS OUTPUT

LANSING, MICH., June 20—Renewed activity is shown in the plant of the Duplex Truck Co., which now is running three full days each week. Developments at the plant lead officials to believe the next two or three months will show rapidly increasing business. A recent order for three passenger motor buses from the South Bend-Elkhart Motor Bus Co. is reported as an encouraging sign.

Thousands to Attend Fargo Tractor Test

Leading Companies Enter Machines for Demonstrations of Power Efficiency

CHICAGO, June 20—Reports from Fargo, N. D., indicate that the demonstration of tractor and horse farming, scheduled for that city June 28, 29 and 30, is attracting wide interest in the Northwest and that a big crowd of farmers and dealers will attend the demonstration. The fact that an effort will be made to show the efficiency of the average tractor and that horse teams will be put at the same work as tractor outfits, not in competition, but in such manner as to leave the onlooker free to draw his own conclusions, has aroused wide interest.

The expectation of large crowds is borne out by the demand made upon the housing facilities of Fargo. There is reason to believe that the capacity of the city will be taxed and hundreds of farmers are planning to drive to the demonstration with their families and camp out along the Red or Cheyenne rivers for the three days of the demonstration. Excellent camping facilities have been provided.

Among the companies that will be represented are the following: International Harvester Co., Avery Co., Emerson-Brantingham Co., Aultman & Taylor Machine Co., Advance-Rumely Co., Rock Island Plow Co., J. I. Case Plow Works Co., J. I. Case Threshing Machine Co., Hart-Parr Co., Eagle Mfg. Co., Liberty Tractor Co., Meadows Mfg. Co., Oliver Chilled Plow Works, Ford Motor Co., American Industrial Development Corp., Paris, France; Hyatt Roller Bearing Co., Timken Roller Bearings Co., Cole Mfg. Co., Minneapolis Steel & Machinery Co., Townsend Mfg. Co.

MOTOR PARTS PLANT STARTS

BRISTOL, CONN., June 18—Motor Parts Corp. has bought the Garrigus plant on Riverside Avenue from the Bristol Machine Tool Co. and will manufacture parts for automobiles. The Bryce plant in Forestville has been taken over by the new concern, which was recently capitalized at $1,100,000 and, commencing to-day, will begin operations with a full complement of employees. Residents interested in the corporation are Frederick N. Manross, John F. Wade, John W. Bryce, Charles H. Curtiss and Roger S. Newell.

REPORT TRADE IMPROVEMENT

SPRINGFIELD, OHIO, June 18—At a conference held recently with E. H. Gilcrest, general sales manager for the Westcott Motor Car Co., the members of the sales force in attendance reported general improvement in business conditions is noticed and that there is a steady increase in sales. The Westcott company is increasing its force.

ALL SECTIONS REPORT SALES GAINS IN JUNE

Milwaukee

MILWAUKEE, June 18 — The Ford Motor Co. branch here showed sales of 4000 cars in April, but this was limited by capacity and output. May sales were 5100 cars and June is certain to reach the same figure. Sales for July are expected to reach 4000. This branch covers 51 counties, or the largest part of Wisconsin. The Milwaukee Retailers' Association is just completing a survey of the local field. President Tom C. McMillen, who heads Overland sales here, said to-day:

"General business conditions in Wisconsin apparently are better than in adjoining States. This is reflected in the automobile market and affects all priced cars favorably except those that have not revised price schedule. Distributors are finding the market good immediately following price reduction announcements. The increased sales in Milwaukee clearly demonstrate that the public was waiting for reductions."

Minneapolis

MINNEAPOLIS, June 17—No doubt exists that the automobile business has improved the first half of June over the two preceding months. A difference of opinion exists as to the percentage of gain. One of the biggest distributors of moderate priced cars put the gain at 30 per cent. At the branches and agencies where prices have been cut and where some models have been out of alignment, especially in the smaller popular sizes, the new prices have stimulated buying. Business still is better in the larger towns than in the country districts for the money situation has not loosened up enough yet to make large buying possible to small dealers.

Des Moines

DES MOINES, June 17—June retail sales show material improvement over April and May. Conservative dealers attribute this to stimulation of business by price cuts. Those cars which made cuts during the past 30 days have had a brisk business. Dealers are perplexed as to whether or not stimulation is permanent or temporary but are inclined to believe that the next 30 days will see more or less activity followed by a letting down, although the stagnation of spring is not expected. Two distributors whose companies made material price cuts report their stocks completely cleaned out.

Kansas City

KANSAS CITY, June 20—Dealers whose prices have been reduced are selling cars in volume—one such dealer being reported to have accumulated orders for delivery as late as August 1.

On the other hand, some dealers who have guaranteed prices for the year are said to be in an embarrassing position, with sales temporarily almost suspended, and danger to them whether the price is cut or not.

Weather has been good for country driving, with renewed interest in motoring, and consequent increase of attention to cars by prospective purchasers, the chief benefit accruing to country dealers.

Columbus

COLUMBUS, June 20 — Under the stimulation of price reductions and better industrial conditions, business in passenger cars in Columbus and central Ohio territory has shown remarkable increases in the past few weeks. Practically all dealers are sharing in the better business.

The public apparently had been waiting for the reductions and immediately stepped into the market and purchased freely. Dealers report a larger number of prospects, many of which are considered high class and likely to be new owners.

In the rural sections there is still some slowness reported although some increase in sales is reported from the dealers in the larger towns. Farmers are now busy with their crops and have little time to look around. With their crops in, it is believed there will be better business in the rural sections.

The truck business is still quiet and the public is apparently waiting for price reductions.

Indianapolis

INDIANAPOLIS, June 17 — Retail sales here show a slight improvement thus far in June over April and May of this year. The average increase is about 10 per cent. The increase actually is more marked on those cars in which price reductions were made. Dealers in handling cars on which price reductions have been made say that for a month or six weeks following cuts a decided increase in sales can be seen but the rate soon decreases. Larger increases are shown by the medium and low priced cars. Dealers in high priced cars report only a slight increase over the two preceding months and in some cases no increase at all.

Boston

BOSTON, June 17—Retail automobile sales during the past few weeks have improved compared to April and May. The dealers whose makers had cut prices found that people who had been holding off came in and closed up orders. There were a number of new orders booked from others who were not on the lists of prospects. All dealers have not been selling as largely as a year ago, of course, but when an average is made of the entire motor district, balancing up the sales of high and low priced cars, and those which have cut with those which have not, the conditions in the trade are much better than a month ago, when there was a lull after the show orders and prospects had been cleaned up.

Portland, Oregon

PORTLAND, ORE., June 18—Sales of new automobiles in Portland during May totaled approximately one and one-half times as many as during April, according to the record of new licenses secured during the two months. Whether June will show further increase or will run behind May in volume is matter of speculation and too early of determine. The record of new licenses, while not showing absolutely in volume of sales for new cars, forms an excellent basis of comparison. According to the record April sales of new cars totaled 444 while May sales totaled 681. In each case slightly over half were Fords.

Recent price reductions have increased activity in some lines, particularly Dodge, but daily license reports indicate that so far all makes concerned reductions have had no marked effect yet in total sales.

Los Angeles

LOS ANGELES, June 17—Stimulated by price reductions, retail automobile sales now are more numerous than in the corresponding period of May or April but indications are that this condition will not continue long. Immediately following price changes, salesmen bore down on every prospect who could be swayed and obtained signed orders. This number now is about exhausted and already a slackening is evident. Business right now is very good and June will be an excellent sales month but southern California has led the entire United States throughout the year and the present cannot be taken as a criterion for the future when the existing impetus will have passed.

Denver

Denver, June 18—Automobile sales in the Rocky Mountain territory have been upset by abnormal conditions due to price unrest and disastrous floods. Some distributors who had a big April and May, report June sales about 40 per cent as good. Some are better and many worse. Few lines are gaining through the new price drop while others are losing in same price class without a drop. Intensive selling is helping two particular makes with price stabilized since a reduction in January. Dealers take the view that the unrest and readjustment are inevitable and hope for an early improvement.

Spokane

SPOKANE, WASH., June 20—The motor trade has improved substantially in Spokane and begins to approximate conditions before the slump. A point in case is the Marsh-Strickle company which placed 19 cars and trucks during the week ending June 4. Improved general conditions and the advent of exceptionally fine weather have combined to stimulate trading.

Durant Plans Ready for Plant on Coast

Will Have Capacity of 20,000 Cars Yearly—Will Not Buy Truck Company

NEW YORK, June 20—R. C. Durant, president of Durant Motors of California, started back to the coast to-day after a brief visit to this city for a discussion of plans for the Oakland plant. He was accompanied by C. M. Stevens, who will be sales manager of the California company.

A site has been purchased in Oakland for the assembly plant, which will have a capacity of 20,000 cars a year. Plans for the building have been practically completed. The factory will be similar in design to the main assembling plant on which work has been begun at Lansing. It will be about half the size of the Lansing plant, which will cost $3,000,000, and have a capacity of 40,000 cars a year. The Oakland building will be 600 feet long and will have three wings besides a large storehouse and an administration building, which will be located in front of the main plant.

The Durant plants at Lansing, Oakland and Long Island City all will be used for assembling. Practically all the parts of the car will be purchased from other manufacturers for the present, but Durant proposes ultimately to build many of them in a factory of his own. The location of this plant has not been decided upon, but it is quite possible it will go to Flint, which has been promised one of the Durant factories.

Reports that Durant contemplates the purchase of some widely known truck company are without foundation. He has not lost his faith in the future of commercial motor vehicles, but his interest will be centered for the present upon passenger cars. A line of trucks ultimately will be added to the Durant products, but it will not be until the outlook for sales in this field is brighter than it is now. He has definitely decided not to undertake the manufacture of tractors or other farm machinery.

Assertions made recently in Wall Street that Durant was buying stock of the Studebaker corporation for speculative purposes were incorrect. Most of the stock he bought was as an investment, and it is now held by Durant Motors, Inc., which is authorized as a holding company to buy the stocks and securities of other companies. It also has in its treasury a considerable quantity of General Motors stock.

Four Durant Companies to Issue Securities

LANSING, MICH., June 18—On account of the fact that Durant Motors, Inc., is to have four distinct branches, Durant Motors, Inc., a Delaware corporation; Durant Motors, Inc., of New York; Durant Motors, Inc., of Michigan, and Durant Motors, Inc., of California, the Michigan Securities Commission has issued an order that all brokers and salesmen for Durant Motors stock must designate to the purchaser in which of the four corporations the stock offered is included. At present two of the corporations are organized and approved, the Delaware and New York concerns. The proposed Michigan company has not yet been incorporated and the same is true of the California company. In each of these cases, however, the only difference is in the designation of the State in which the company is incorporated.

According to information given the Securities Commission, the Delaware company is the holding corporation of the Durant chain. The New York company will manufacture automobiles for the territory east of the Alleghenys. The California company will supply the Pacific Coast and Mexico, and all of the central part of the country between the mountain chains will be served from the Lansing plant where parts will be manufactured and cars assembled.

At present only Durant Motors stock of the Delaware corporation is being offered in Michigan.

Reo Opens Coast Branch, Sales Officials Change

DETROIT, June 20—Several changes are announced in the Reo organization, including the establishment of a branch house in San Francisco to handle business in California and along the Coast, and to serve as an export basis for the Pacific islands and the Orient. Carl Parker, manager of the Lansing-Reo branch, has been transferred to the sales organization at the factory and is succeeded by George Hopkins.

The California branch will be managed by P. L. Emerson, who has been an assistant to Sales Manager R. C. Rueschaw and an auxiliary to the branch in California, a large wholesale and retail establishment in Los Angeles will be under the management of Byron C. Foy, now assistant manager of the Detroit-Reo branch. C. P. Green of the engineering department will be in charge of service at the San Francisco branch. Establishment of the Western branch completes a chain in Reo branch houses extending across the continent, the others being at New York, Detroit and Chicago.

MACK BRANCH FOR HOUSTON

HOUSTON, TEX., June 20—The International Motor Truck Corp. is planning to establish a factory branch here. This was announced this week when J. George Truelson, formerly of Dallas, was made district Southwestern manager for the company. The branch here will take care of business in Mexico and the Southwest generally, it was said. Company officials declare there is a fine business prospect in Mexico and the rail and water shipping facilities here cause the factory branch decision. The company has factory branches at Dallas and Fort Worth.

New Driggs Car Near Manufacturing Stage

New Haven Product Is Designed for Fuel Economy—Weight 1600 Pounds

NEW HAVEN, CONN., June 21—The production of a new four-cylinder car will shortly be started at the New Haven plant of the Driggs Ordnance & Mfg. Corp., of which L. L. Driggs is president. The car is called the Driggs and sells for $1,175 in the touring model and $100 more for the special roadster. The Driggs Ordnance Mfg. Corp., while a newcomer in the automobile manufacturing field, has behind it extensive experience in the manufacture of ordnance and automobile parts.

The new car has been designed for minimum gasoline consumption. While rated at about 11 S.A.E., the engine actually delivers 18 hp. The bore is 2⅝ and the stroke 4½ inches. Several tests made with the experimental cars convince the manufacturers that the machine under tolerably good conditions will run at least 30 miles to a gallon of gasoline. When fully equipped, the car weighs only a trifle over 1600 lb.

The engine is three points suspended. Ignition is by battery, with the option of a magneto for use abroad. Lighting and starting are by the Gray & Davis system. The clutch is a Borg & Beck dry disk, while the transmission is of the selective type, with three speeds forward and one reverse. Service brakes are of the contracting type, emergency brakes expanding.

The front springs are semi-elliptic, but the rear springs are of the cantilever type, extending from the rear end of the frame forward to the axle. The company will manufacture its own rear axles, which are of the three-quarter floating type, with taper roller bearings. The front axle is the drop forged I-beam type, also with roller bearings.

The pump and splash system of oiling is used, and cooling is by the thermo-syphon method. The gasoline tank, of 10 gal. capacity, is located in the rear, with vacuum feed to the carburetor. Steering is to be standard left hand, although the right hand drive may be had at an additional charge. All bodies (including a sedan) are mounted on the 104 in. wheel base chassis.

SEVERIN PETITION FILED

KANSAS CITY, June 20—An involuntary petition in bankruptcy has been filed in the Federal Court against the Mokaw Motor Co., makers of the Severin car, by the Equipment Co., the Mutual Motors Stores Co., the Ever Ready Tire & Service Co., the Thomas Cusack Co. and Price Cary, whose claims total about $1,500.

The Mokaw company succeeded the Severin Motor Co. several months ago. A hearing on the petition will be given next week.

Banks Arrange Plan to Finance Willys

Proposal Calls for Underwriting $20,000,000 in Mortgage Bonds at 8 Per Cent

NEW YORK, June 22—After a series of conferences extending over several months, the bank creditors of the Willys-Overland Co. have agreed upon a plan for refinancing the company in such a way that its overdue bank loans, amounting to $21,000,000, can be paid. The proposal calls for the underwriting by a strong banking group of approximately $20,000,000 in first mortgage, 8 per cent bonds. This will provide funds to pay the bank loans, and with the cash now on hand, which approximates $10,000,000, the company would be in a strong financial position.

It is assumed a similar plan will be adopted for the Willys Corp. and the Moline Plow Co., both of which are being directed by creditors' committees.

Announcement that this plan has been decided upon by the bankers' committee makes it evident that more than three-fourths of the preferred stock outstanding has given its consent. The preferred stock of all the Willys companies contains the provision that without the consent of 75 per cent of the amount outstanding no mortgage can be placed on its property and that neither the parent company nor any subsidiary company can place any mortgage on its property or create any stock having priority over or on a parity with the present preferred stock or dispose of any material part of its property. Preferred stock has preference as to assets as well as to dividends, and in case of voluntary liquidation is entitled to 110 per cent and accrued dividends.

The Willys-Overland preferred stockholders must consent to any similar plan for the refinancing of the Moline Plow Co., which is to all intents and purposes a subsidiary. Willys-Overland does not control the Willys Corp. Three distinct banking groups are involved in the transactions.

Chrysler Division Separate

Under the new financing plan, it is understood, the huge new plant at Elizabeth, N. J., where the "Chrysler six" is to be built will be made a separate division. It is now a part of the Willys Corp. but there is reason to believe it ultimately may be taken over by Walter P. Chrysler, executive vice-president of the Willys enterprises.

Another plan under serious consideration is the merger of the Auto-Lite Corp. and the New Process Gear Corp., which also are parts of the Willys Corp.

The Elizabeth plant was nearing completion when the depression began and at the behest of the bankers production in it was deferred until the market outlook became more favorable. This project is one close to the heart of Chrysler but it is now about the only unprofitable Willys unit, for Auto-Lite and New Process Gear are reported to be doing an excellent business. If these two companies are merged and the Elizabeth plant sold to Chrysler, all the Willys enterprises may be brought together into one company under the original plan of the bankers, announced in AUTOMOTIVE INDUSTRIES several months ago.

Townsend Presses Senate for Passage of Bill

WASHINGTON, June 21 — Senator Townsend is pressing the Senate for the immediate consideration of his bill to provide for the establishment, construction and maintenance of a post road and interstate highway system under the direction of a Federal Highway Commission. The reports of the majority and minority members of the Senate Committee on Postoffices and Post-roads were submitted to the Senate and were ordered printed on Monday. It is expected that the measure will be enacted within a few weeks. For the majority, Senator Townsend submitted the report favoring the continuation of Federal aid in the construction of highways for two years.

In discussing the need of highways and the importance of the motor vehicle, the committee stated:

"A new era in transportation confronts the United States. An evolution of far reaching social, political and industrial importance has been effected through the constantly growing use of highway transport. The modern vehicle has rendered obsolete old methods of highway construction. The question is no longer local alone in application; it is national. Obviously, our highway policies must be broadened and strengthened to meet this changed condition if public expenditures are to be conserved and the best interests of the nation cared for. Living costs can be reduced, our defense strengthened, and a new spirit of nationalism created, if we use intelligently this new means of communication between communities and states."

The report of the minority dissenting from the report of the majority was regarded as an appeal to prejudice in the interest of the farmers, and a defense of the present law which President Harding and others have condemned.

FORM NEW REYNOLDS COMPANY

DETROIT, June 17—The Reynolds Truck Co., Mt. Clemens, Mich., an outgrowth of the Reynolds Motor Truck Co., which went into receivership last spring, has been incorporated with a capital of $75,000 and approved by the Secretary of State. Albert Schott is president, Fred B. Schott, vice-president, and L. F. Wolf, secretary-treasurer. These officers were stockholders in the old concern. Charles Kennan of the Service Garage at Mt. Clemens, who purchased the property of the former company, is sales manager. Kennan said yesterday there is sufficient material on hand to permit the manufacturing of 150 trucks.

Big Plants Speeding to Meet Sales Push

Notable Increases Are Made at Dodge and Chevrolet in Recent Weeks

DETROIT, June 21—The influence of recent price reductions is reflected in increased production in Michigan factories, notably Dodge and Chevrolet. The big Dodge plant is turning out an average of 425 daily as compared with an average of 288 in May. Chevrolet is maintaining its schedule of 176 daily against an average of 118 in May. Buick, which ran around 250 daily in May, now is hitting near 300.

Ford is running to capacity, maintaining an average of 4100, and Ford officials said the present schedule would be maintained indefinitely. Paige, according to W. K. Towers, advertising manager, is keeping to its schedule of about 35 daily which was also the May average. Packard is building on a schedule of 1000 single sixes in June as compared with 800 in May, and Cadillac is running about the same as last month, which is around 55 daily.

Studebaker is producing about 335 daily in Detroit and South Bend against 292 in May. A slight increase is reported at the Oakland factory and by Hupp. Olds Motor Works are producing at about the same ratio as in May, though the month's total will be greatly increased because the plant was down several days in May. Reo also is continuing on its May schedule.

The Maxwell and Chalmers plants, which built 50 and 20 daily in May are now producing in conformity with the increased demand though officials will not give out actual figures. Brisk demand for Hudson and Essex compelled a speeding up in production and officials say reports from all sections indicate an improved market. One train of 40 cars left the factory for Chicago last week carrying Essex touring cars.

Tire Makers to Promote Straight Side Use Abroad

NEW YORK, June 22—Subjects of interest to the entire industry were discussed at a meeting of the executive committee of the tire manufacturers' division of the Rubber Association of America at Atlantic City last week. One of the most important was the request of Secretary of Commerce Hoover that the association co-operate in the gathering of statistics covering inventory, production, sales and production capacity. Members of the committee expressed a willingness to work with the Department of Commerce so far as possible. Much interest was displayed in foreign trade and a program was adopted for the promotion of straight side tire sales in other countries. Discussion was continued on various phases of standardization.

Decrease in Exports Due to Short Credit

Automotive Shipments Abroad Far Below May, 1920, Figure —All Lines Hit

WASHINGTON, June 20 — Further decline in the volume of foreign sales in automotive products is revealed in the report of the Department of Commerce on export conditions during May. The falling off of export business affected all branches of the trade because the sales of cars, parts and engines were at very low ebb. Foreign trade experts attribute the decline in all commodities to inadequate credit facilities and problems of international finance.

Despite the fact that promotors of foreign trade are optimistic, the economic story revealed by the statistical studies show other tendencies. For instance, shipments of commercial cars during May of this year numbered 462, with a value of $794,699, as compared with 3194 cars and a value of $4,858,026 for May of 1920. These figures show a slump of more than $4,000,000 in one item. Total shipments of trucks for the eleven months ending May, 1921, amounted to 17,180, with a value of $28,980,721, and for the same period last year there were 21,659 commercial cars exported with a declared value of $37,361,182.

Shipments of passenger cars fell off at a more alarming rate. The export records show that 2479 passenger cars with a declared value of $2,973,334, were exported during May, 1921, while in May, 1920, the exports of passenger cars amounted to 14,990, with a value of $16,434,244.

Exports of automotive parts, not including engines and tires, during May of this year, were valued at $3,204,723, as against $8,382,749 in May, 1920. Despite this reduction, the total value for the eleven months ending May, 1921, was greater than the corresponding period of 1920. The same condition exists in respect to airplane shipments.

The most significant decline in volume of engine reports was that of tractor engines, as exports for May, 1921, amounted to 18 engines, with a value of $34,108, as compared with 2286 engines and a value of $2,475,346. The eleven months total of 13,366 tractor engines stacked up fairly well with the corresponding period of last year, when 18,522 engines were sold abroad.

JUGO-SLAVIA HAS 2000 CARS

WASHINGTON, June 18 — Official figures for the year ended April 24, 1920, showed the number of motor vehicles in Jugo-Slavia to consist of the following: Passenger cars, 1592; trucks, 274, and motorcycles, 290, according to a report received from Vice-Consul Don S. Haven, Belgrade. The figures do not include about 2000 cars of all classes under the control of the Ministry of War.

Exports of Automobiles, Airplanes, Trucks, Farm Tractors, Motorcycles and Parts for May and 10 Previous Months

	May				11 Months Ending May			
	1920		1921		1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Airplanes	17	$214,000	7	$29,500	59	$430,694	63	$446,455
Airplane parts	..	198,633	..	37,673	..	633,827	..	186,603
Commercial cars	3,194	4,858,026	462	794,699	21,659	37,361,182	17,180	28,980,721
Motorcycles	4,324	1,144,467	564	178,686	32,484	8,860,537	24,157	7,631,945
Passenger cars	14,990	16,434,244	2,479	2,973,534	102,786	110,897,663	82,466	101,720,480
Parts, not including engines and tires	..	8,382,749	..	3,204,723	..	58,863,464	..	65,198,078

Engines

	May				11 Months Ending May			
	1920		1921		1920		1921	
	No.	Value	No.	Value	No.	Value	No.	Value
Automobile, gas	3,965	$615,771	1,202	$248,637	35,305	$5,389,282	13,631	$2,536,811
Marine, gas	1,368	390,850	357	113,038	9,147	3,154,036	6,588	2,470,303
Stationary, gas	3,260	578,180	688	136,184	25,752	3,948,332	22,664	4,374,253
Tractor, gas	2,286	2,475,346	18	34,108	18,522	17,731,655	13,366	13,445,300
Total	10,879	$4,060,147	2,265	$531,963	88,726	$30,223,305	56,249	$22,826,667

A German concern has recently put 100 trucks on the local market, but a close estimate of the increase in motor vehicles for the past year does not exceed 400 passenger cars and 200 trucks.

New Interests Propose Angus Sanderson Deal

LONDON, June 10 (By Mail)—The British licensee for the Dutch Spyker car has come to the rescue of the Angus Sanderson Co. with a financial proposition which probably will be accepted. He proposes to build the Spyker car together with the Angus Sanderson in the new plant of J. Tylor & Son, Ltd., engine builders, at New Southgate. He agrees to buy the Tylor assets for $625,000, provide $450,000 to finance the project and guarantees unsecured creditors 25 per cent of their claims in cash and 15 per cent of the profits until they are liquidated.

BETHLEHEM TO MAKE WHEEL

BETHLEHEM, PA., June 22—The Bethlehem Steel Corp. is entering the automotive field with the development of a steel wheel for light and heavy motor trucks. This wheel is being made by a special process and has not developed to a point where it can be placed on a commercial basis, but experiments with the wheels are being made on trucks in various parts of the country and the results thus far have been so successful that the corporation expects to have the wheel on the market in a short time.

TO DRAFT OIL STANDARDS

WASHINGTON, June 21—Conferences will be held here July 2 by the Technical Committee on Standardization of Petroleum Specifications, for the consideration of specifications under which the Government purchases gasoline, fuel and lubricating oils.

British Trade Shows Heavy Falling Off

LONDON, June 10 (By Mail)—In May Great Britain imported 425 cars, 137 trucks and 305 chassis for cars and trucks, and 27 motorcycles. The respective figures for May, 1920, was (in the above order) 2593, 1254, 1146 and 193. The value of imported car and truck parts was $1,333,725, as against $2,212,565 in May, 1920, and of motorcycle parts $38,345, as against $45,100 in May, 1920. The value of the month's tire import was $70,290, against $1,575,205 in May, 1920.

The month's export of British automobiles and tires was ninety cars, of which 10 went to British India, 3 to New Zealand and 77 to unspecified countries; 73 trucks of all categories, of which 47 went to British India and 26 to countries not specified, and 94 chassis, of which 1 went to British South Africa and 93 to not specified countries. The corresponding export figures for May, 1920, were 248 cars, 71 and 226. The value of the month's parts' export was $635,715, against $841,225 in May, 1920.

The month's export of British motorcycles was 864, as against 1599 in May, 1920. The month's value of British motorcycle parts exported was $105,475, as against $238,660 in May, 1920. The value of British tires exported was $687,170, as against $2,415,880 in May, 1920.

DORT MAKES SECOND CUT

DETROIT, June 24—The Dort Motor Car Co. announces the second price cut in a month, effective immediately. The touring car and roadster are reduced from $1,115 to $985; the coupe from $1,685 to $1,535, and the sedan from $1,835 to $1,685.

It is understood that a reduction of $200 on all models of the Briscoe car will be announced July 2.

Business in Nation Close to 1920 Total

Volume of Sales in April Exceeds 1919—Some States Equal 1920 Figure

NEW YORK, June 22—Statistics of the volume in dollars of monthly purchases of all classes of commodities by individuals and business concerns in all the states of the Union, show that in a majority of the districts the volume for April, 1921, exceeded April, 1919, and that in some states it was almost equal to 1920.

The districts in which April sales for 1921 exceeded those for the same month in 1919 were New England, Pennsylvania, Ohio, Virginia, Georgia, Illinois, Texas and the Pacific Coast. They were virtually the same in the New York and Northwest districts. They were slightly less in the Missouri district.

Accepting the average of sales for April for a 10-year period as normal, April sales this year ran far ahead of normal except in the State of Delaware. The volume of April sales this year ran behind April, 1920, however, except in Arkansas and Wyoming. There was a very slight decline in California, Idaho, Nevada and Utah, and other states in which the falling off did not exceed 10 per cent were Connecticut, Delaware, Indiana, Maine, Maryland, New Jersey, Pennsylvania and West Virginia. The heaviest shrinkages were in Georgia, Kentucky, Louisiana, North Carolina, North Dakota, South Dakota, Tennessee, Mississippi, Nebraska and Washington.

Census Statistics Show Tire Growth Tremendous

WASHINGTON, June 18—Development of the automobile industry is reflected in the report of the Bureau of the Census on the manufacture of rubber goods in 1919 and 1914. The comparative summary shows that the total value of rubber products manufactured in 1919, in 475 establishments, was $1,138,216,000, as compared with 342 establishments and products valued at $300,994 000 in 1914. Of the 1919 total, pneumatic tires casings were valued at $485,904,000.

There were 39,700,000 inner tubes valued at $199,305,000 produced in 1919, as compared with 7,908,000 tubes, valued at $20,101,000, in 1914. Casings for motorcycles and bicycles produced in 1919 aggregated 3,422,000, with a value of $11,892,000. Inner tubes for motorcycles and bicycles in 1919 numbered 1,393,000, with a value of $2,904,000. Statistics show that solid truck tires amounted to 1,820 000, valued at $43,917,000, in 1919. All other solid tires total 6,635,000 and $9,005,000. The total production of solid tires of all kinds in 1914 was valued at $13,736,000. Rubberized fabrics for automobiles and carriages produced in 1919 amounted to 14,429,000 yd. valued at $10,697,000.

Ford Record Now 4322 Cars a Day

DETROIT, June 22—The Ford Motor Co. broke its 1921 record and all other motor vehicle records yesterday with a production of 4322 cars and trucks. The rate for the first half of June assures completion of the schedule of more than 100,000 for the month. Officials say the present output will be continued through July and as long as the demand keeps up.

Ferris Receivers Named, Will Continue Schedule

CLEVELAND, June 21—Federal Judge D. C. Westenhaver to-day appointed William E. Ferris and Norton McGiffin receivers for the Ohio Motor Vehicle Co. They gave $25,000 bonds each. The receivers were appointed upon the application of the Continental Motors Co. of Detroit which alleged in its petition that the Ohio corporation was indebteded to it in the sum of $32,880 for motors delivered and unpaid for.

Charles Riegler, president of the Ohio Motor Vehicle Co., stated that his company had insufficient cash on hand to pay its obligations as they mature. The obligations are placed at $175,000 by Riegler. He says the company is solvent and will pay all creditors in full if the assets are properly protected and are not dissipated. The physical assets of the corporation, exclusive of patents and good will, amount to $600,000.

The embarrassment of the company arises from the fact that it is no longer able readily to dispose of its products which consist of the Ferris automobile tractors and trailers. Most of the company's indebtedness now is for parts that have gone into the production of cars and tractors worth $250,000.

Riegler said that market conditions had hampered the company and that it had been sued by 20 different creditors, some of whom have obtained judgments. He asked that the receivers be given authority to conduct the business. Judge Westenhaver gave the receivers full authority to operate the plant and to sell its products. Word has been passed out to the trade that the corporation will promptly fill all orders, carry out all contracts and proceed as before.

EXPECT ORDER TO SELL COTTA

ROCKFORD, ILL., June 18—Trustees of the Cotta Transmission Co. expect within a week to receive a court order to discontinue operation of the plant and sell the property. Since the declaration of the company as a bankrupt, trustees were permitted to operate the plant under an order expiring June 1. Many creditors have signed a petition asking that the plant continue until Oct. 1 but no new orders are on hand.

G.M.C. Awards Stock Under Bonus Plan

Shares Totaling 123,884 Distributed to 6577 Employees for Work in 1920

NEW YORK, June 22—General Motors Corp. this week is awarding 6577 of its employees 6332 shares of the 7 per cent debenture stock and 117,552 shares of the common stock of the corporation as bonus for the calendar year ended Dec. 31, 1920.

The bonus plan was adopted in 1918 as a solution of the problem of how employees of exceptional merit might be induced to remain with the corporation for a period of at least five years. This profit sharing plan is also substantial recognition of the fact that in a marked degree the success of the corporation may be attributed to the inventions, ability, industry, service and loyalty of its employees.

Employees, by the operation of the plan, are made partners and part owners in the business and thereby encouraged to further effort and initiative. It is the intention to continue the plan year after year, the right being reserved, of course, to modify or repeal the plan at any time; however, a bonus once granted an employee cannot be recalled or modified.

The annual awards under the bonus plan are held in trust for the employee for a period of five years, but during that time dividends are paid direct to the employee. The awards for the three years during which the plan has been in operation follow:

Years Ended Dec. 31	Number Shares Common Awarded	Number Employees Receiving Common	Number Shares 7% Deb. Awarded	Number Employees Receiving 7% Deb.
1920...	117.552	3,210	6,332	3,367
1919...	214,659	1,721	14,088	4,709
1918...	261,460	2,277	....	....
3'd total	593,671	7,208	20,420	8,076

The corporation each year, after deducting from net earnings 6 per cent of the capital employed in the business, sets aside 10 per cent of the remaining net earnings and this amount of money is placed in the bonus fund, which is invested in the common and 7 per cent debenture stock of the General Motors Corp. The total amount of money set aside out of earnings in the three years, 1918, 1919 and 1920, with which to carry out the bonus plan work is in excess of $13,000,000, and this does not include the expenditures of administration.

ILLINOIS TRACTOR IN SUIT

BLOOMINGTON, Ill., June 18—Charging misrepresentation in sale of stock, S. W. Cramm, of Kansas City, has filed suit for $25,000 damage against the Illinois Tractor Co. and its Board of Directors. The bill alleges that Cramm subscribed to stock to the amount of $9,180. He said it was represented that the stock was worth $150.

Nash Cuts Prices on Complete Line

Reductions Ranging from $150 to $250 Will Become Effective on July 2

KENOSHA, WIS., June 23—The Nash Motors Co. announces a reduction in prices of Nash passenger cars, both six and four cylinder models, ranging from $150 to $250. These prices, effective July 2, are as follows:

6 cylinder	old price	new price
5 passenger touring	$1695	$1545
7 passenger touring	1875	1695
7 passenger sedan	2895	2695
4 passenger coupe	2650	2395
2 passenger roadster	1695	1525
4 cylinder	**old price**	**new price**
5 passenger touring	$1395	$1195
2 passenger roadster	1395	1175
3 passenger coupe	1985	1735
4 passenger sedan	2185	1935

In a statement announcing the price cut, C. W. Nash said the reductions represented lower production costs in the plants at Kenosha and Milwaukee. He added that during the four years prior to last October Nash prices had risen only 31 per cent. Plant economies have been effected by the installation of the latest labor and time saving devices.

HANDLEY CUTS TOURING CAR

KALAMAZOO, MICH., June 22—The Handley-Knight Co. has reduced the price of its seven-passenger touring car from $2,985 to $2,850, making a total reduction of $500 since last November. Prices of the sedan and deluxe models remain unchanged. The company notified its distributors on June 1 that prices which prevailed then would be guaranteed up to Jan. 1.

CADILLAC NOT TO CUT PRICE

DETROIT, June 22—President H. H. Rice of the Cadillac Motor Car Co. denied to-day reports current here that the price of the Cadillac would be cut July 1. "We have said right along there would be no reduction in Cadillac cars this year and that statement stands," said Rice.

MORELAND TRUCK REDUCED

LOS ANGELES, June 22 — Moreland Motor Truck Co. has reduced prices on all models effective to-day. The 1½-ton model is priced at $2,800; 2½-ton, $3,500; 3½-ton, $4,600, and 5-ton, $5,000. The former prices on these models were $3,125, $3,900, $4,975 and $5,350, respectively.

VICTOR INCREASES OUTPUT

SPRINGFIELD, OHIO, June 20 — Starting to-day the Victor Rubber Co. will increase its production from 500 to 700 cord tires per day. "The outlook for business is much better," said H. H. Durr, secretary-treasurer of the company. "Dealers' trade is reported good in practically all sections, but there is a slight slump among the big factories on new cars. Our company sells to dealers and as a result business is good." Durr said that the rubber mat department is rushed with work.

U. S. Car Sales to Cuba Total $8,618,270 in 1920

HAVANA, CUBA (By Mail), June 20—A compilation of automobile imports from the United States shows that in 1920 they were valued at more than twice as much as in 1917. The following table shows the number and value for four years:

	1917	1918	1919	1920
Number	3446	2400	3935	5715
Value	$3,364,551	$3,394,830	$4,921,648	$8,618,270

Imports from other countries were insignificant except last year when 112 cars valued at $256,559 were imported from Germany; 71 cars valued at $132,701 from France and nine cars valued at $12,451 from Italy. The total value of automotive imports in 1920 was $9,031,589.

Wilson Assumes Place as Maxwell President

DETROIT, June 21—In assuming his duties as president of the Maxwell Motor Corp., W. R. Wilson declared he welcomed the opportunity presented by his new position for getting a further insight into the automobile business.

"During the period I have been out of direct contact with the automobile industry," he said, "I have watched its development very carefully. I have had a vantage for observation that is in a measure denied those who have been active in it as I have had the benefit of distance in looking at its present problems and its promising future. I feel that the Maxwell offers a wonderful opportunity."

Louisiana Protests High Gasoline Prices

SHREVEPORT, LA., June 20—Automobile dealers and users here are incensed because of the continued high prices of gasoline, when small Texas towns less than 40 miles away are favored with a rate 5c per gallon less. Voicing the sentiments of local automobile dealers and users, George D. Wray, an official of the Shreveport organization, has sent the following telegram to former Lieutenant Governor T. C. Barrett, member of the Constitutional Convention at Baton Rouge:

"Automobile dealers of Shreveport, seriously protest against continued high prices of gasoline in Louisiana. Texas points having no refineries are quoting 18c or lower at filling stations. Price at Shreveport is 23c. Perhaps this is not the business of the Constitutional Convention, but it is a matter which should engage the attention of every citizen of Louisiana who has the best interests of his state at heart. Forty thousand users of gasoline in Louisiana would like to see some action taken before adjournment."

Pierce-Arrow Assets Far Exceed Liabilities

NEW YORK, June 23—The balance sheet as of April 30 of the Pierce-Arrow Motor Car Co. shows quick assets of $20,878,000 and current liabilities of $8,379,000, a ratio of approximately two and one-half of assets to one of liabilities. Directors of the corporation said that the information is made public at this time to refute rumors in Wall Street. Both the common and preferred stock of the corporation were under pressure yesterday, the preferred dropping 5⅜ points to 34 and the common 3½ points to 15⅝.

"The Pierce-Arrow Motor Car Co. is in a sound condition," said the statement. "Of course our business has slumped and the truck business is very poor. We sold 2200 passenger cars last year. Our schedule this year was 1000 passenger cars to June 1. We have sold and shipped 850 of these and we now have orders for 350 cars on our books.

"Our cash on hand, as of this morning, amounts to $1,137,000. Our bank loans are $6,650,000 and our borrowing limit has by no means been reached. Among our quick assets we have listed $17,027,000 as inventory, and cash on hand, and current assets and accounts receivable of $3,851,000. On the other hand, our liabilities are $1,604,000 in bills for raw materials, $125,000 due customers for deposits and $6,650,000 in bank loans."

Rear Bumpers to Make Lower Collision Rate

MILWAUKEE, June 20—Milwaukee automotive dealers have just received advices of additional reductions in collision insurance that will become effective July 1. The Automotive Underwriters' Conference, which for some time has given a 10 per cent reduction in the collision insurance rate for the use of front bumpers, so far as such accessories are approved by the Underwriters' Laboratories of Chicago, will offer an additional 2½ per cent reduction for the use of approved rear bumpers, when the list of such bumpers is ready. The casualty department of the laboratories is now making tests and will issue new list July 1.

Front bumpers have been found unsuitable.

Austin Light "Four" to Appear in Fall

Design Will Follow Specifications of "Twenty"—Coal Shortage Hits Rover

LONDON, June 10 (By Mail)—Design of the new light car which the Austin company will standardize for 1922 is not definitely settled, but it will be of 10 hp. and practically a replica of the Austin "twenty." It will have a 4-cylinder detachable head engine with side valves, three point suspension as unit with four-speed gear set, the latter with central control. Bore and stroke are to be 2 7/8 x 4.

Other details include silent chain for distribution, pump water circulation, fabric disk, universal joints, helical bevels, straight sided frame, tapering front to rear, and semi-elliptic springs. Two types of body will be standardized—four-passenger and coupe. The new model will be shown for the first time at the Olympia show in November.

The hearing of the petition of creditors for action on their claims has been adjourned for several months to give the company opportunity to complete its working plans. Operations are continuing under the receivership.

Judgment was entered this week in default of defence against the Austin Motor Co., in the suit of the Eagle Star & British Dominions Insurance Co., holders of all the first mortgage notes of the Austin Co., the value of which is £150,000 and carrying 10 per cent interest. The judge, besides deciding for the Eagle company, directed an account to be taken of what is due to a London bank as holders of the second mortgage debentures.

Limited coal supply, owing to the miners' strike, has compelled the Rover company to reduce its output of the new 8-hp., air-cooled, 2-cylinder runabout. Orders had been received warranting a production of 200 weekly, but this is now cut to one-third of that schedule.

Owing to the national financial tightness the Air Ministry will dispose of the six airships now under its control. These are ready to operate under commercial conditions from a mooring mast. The capital of any company acquiring the ships must be controlled by British shareholders and the Air Ministry must be represented on the board of directors.

Entry of implements for the farm tractor and implement tests to be run in the autumn at Shrewsbury by the Society of Motor Manufacturers and Traders, Inc., has been so large that it has been necessary to obtain special land for their trials. To further encourage a bigger entry list, the closing date was extended to June 30.

PHILIPPINES DOUBLE ROAD WORK

NEW YORK, June 18—Nearly 200 kilometers of new road were completed in 1920 in the Philippine Islands, according to reports received by the Bureau of Foreign and Domestic Commerce showing that the total expenditure of $1,905,645 for public works that year was about $1,100,000 greater than during 1919. Many roads were reconstructed and numerous bridges built. Waterworks and irrigation systems also were gotten under way which are designed to benefit about 300,000 hectares of agricultural land when the projects are completed.

British Dunlop to Make Straight Side Tires

NEW YORK, June 18—News has just reached this country that the Dunlop Rubber Co., the largest tire manufacturing concern in Great Britain, has decided to manufacture straight side tires for passenger cars hereafter. In a recent talk to members of the press the production organizer of the Dunlop company summarized the advantages of the straight side tire as follows:

"The straight side type carries within itself the inextensible edges which resist the outward radial pressure due to inflation of the air tube. The beaded edge type, on the contrary, depends on the proper engagement of the thickened edges with the inturned lip of the rim. The stresses and movement of the cover at this point produce a serious risk of failure by rim cutting.

"The straight side rim provides a wider base for the tire than is possible with the beaded edge type and holds the tire more steadily, prevents roll reducing the tendency to side slip, provides greater air space, and consequently increased cushioning capacity within the tire, and entirely eliminates accidental bursts due to careless fitting.

"The attachment is sound and simple; it is effected without any strenuous levering and stretching of stiff edges into or out of position as is necessary with the beaded edge type. The larger and heavier the tire the more marked the advantage of the straight side type. It is only the lighter weight and greater pliability of the smaller sizes which still permit small beaded edge tires to compete with the straight side type.

"When in position on the rim, no sudden deflation from a cut can cause the straight side tire to leave the rim, and there is no possibility of the tire edges blowing over the flanges. The straight side type of tire has proved the most secure tire for racing work."

TO CLEAR WAREHOUSED STOCKS

NEW YORK, June 18—Preliminary organization of the liquidating corporation to handle and dispose of any unclaimed merchandise in South American customs houses will be undertaken by a committee of eight, among whose members are C. I. McReynolds of the General Motors Acceptance Corp. and S. A. Breese, of the International Harvester Co. The committee was announced by the Argentine-American Chamber of Commerce here and will proceed with the organization plans at once.

METAL MARKETS

MARKET opinion has now been unanimous for several weeks that steel prices must and will be reduced. There has not been and is not now such concord of view as to the time when this generally looked for downward revision of prices will materialize. Still greater disparity of opinon prevails as to the extent which the expected cut in prices will assume. In fact the minds of those who as a rule are qualified by experience and intuition to pass worth while judgment on the impending course of the market are so far apart on this subject that its discussion is eschewed—seemingly by common consent. In seeking to arrive at an estimate of what would constitute a logical reduction in steel prices the consumer is naturally tempted to have recourse to the pig iron market as a plumb line. Eliminating from consideration the period of 1916, when the pig iron market in its upward climb was for a brief spell on the same basis as it is to-day, prevailing levels put the market back to where it was in September, 1907. In the latter month billets sold at around $29, compared with the present quotation of $37. The average price for black sheets, No. 28 gage, in 1907 was 2.50c., compared with the present nominal quotation of 4c. If the forthcoming cut in steel prices is to re-establish the conditions that prevailed in 1907, i. e., the ratio which then prevailed between pig iron and steel prices, it would have to range approximately from 25 to 37½ per cent. Even if the fervently prayed for revival in demand should exceed the fondest expectations, the steel market of 1921 and 1922 is bound to be in more precarious a condition than was that of 1907, for the simple reason that capacity is so much greater. So that taking for granted as preliminaries to any reduction in steel prices a satisfactory pruning of freight rates and further paring of wages, a 25 per cent cut in prices when the cut does materialize, would be consonant with conditions in general and with those in the pig iron market in particular. It is, however, not at all improbable that by the time revision in steel prices materializes, the pig iron market will have rebounded from its present low levels. At best it is never an efficient instrument for measuring the future trend of steel prices. The probabilities are that the powers that be will permit the steel market to find its own low levels in the present depression, resorting to more and more shut-downs to meet the situation, thus facilitating the downward readjustment of wage schedules. Constructive action with reference to prices will be deferred until sufficient demand has accumulated to make revision of prices yield immediate results in the form of orders.

Pig Iron.—Inquiry by the Ford Motor Co. for 60,000 tons of ore is not looked upon as presaging contracts for that tonnage. Experience throughout 1921 has convinced the iron ore and pig iron trade that there is a wide gulf separating inquiries from actual orders and sales. Buyers, for the time being, can make their own prices for foundry and malleable pig.

Steel.—Virtually no new business is forthcoming from the automotive industries. Cold-rolled strip steel and steel bars are moving in less than carload lots, if at all. It is stated that the Sharon plant of the Savage Arms Corporation, which has closed for repairs, will resume as soon as these are completed, to continue production of frames for the Dort Automobile Co. Spasmodical sales of sheets in retail tonnages are the order of the day.

FINANCIAL NOTES

Studebaker Corp. earnings for the second quarter of 1921 which ends June 30, are $8 a share. The quarter is the best in the history of the company. Earnings for the first quarter were slightly better than $3, which means that the $7 dividend for the year has been earned with a margin of $4.

Hendee Mfg. Co. has reduced the total of its bank loans to $240,000, a reduction of $610,000 since 1920. Accounts payable have also been reduced to $262,000, a reduction of about $600,000 this year.

Elgin Motor Car Corp. will offer $500,000 serial debenture 8 per cent notes to stockholders at par. They will mature in one year $100,000; in two years $150,000, and in three years $250,000.

Sayers & Scoville Co., Cincinnati, has declared the regular quarterly dividends of 1½ per cent on both preferred and common stock, payable July 1.

American Bosch Magneto Corp. has passed the quarterly dividend due at this time. The company had been paying at the rate of $1.25 a share.

Reo Motor Car Co. has declared the regular quarterly dividend of 2 1-5 per cent on the common stock, payable July 1.

Stutz Motor Car Co. directors were all re-elected at the annual meeting of the company.

INDUSTRIAL NOTES

Neskov-Mumperow Motor Car Co., St. Louis, has entered the storage battery manufacturing field, producing the Hy-Volt battery. Harold Dickelman, who has been associated with several local battery concerns, has been appointed manager of the new branch of the business. The new battery is sold under a two-year guarantee.

International India Rubber Corp., South Bend, Ind., is now the Odell Rubber Co., the change being now officially announced by the directors of the company. The business of the company will not be changed in any detail. New offices and warerooms at the plant will be completed by July 1.

Ward-Boucher Specialty Mfg. Co., Minneapolis, has been incorporated to manufacture an auto signal which operates from a button on the steering post an arrow at either side of the windshield to give a traffic warning.

Cutler Auto Radiator Co., Inc., Camden, N. J., has been incorporated with $125,000 capital stock, to manufacture a new type of automobile radiator having a removable and floating cooling unit.

Soss Mfg. Co., Brooklyn, N. Y., manufacturers of Soss automobile hardware, has completed an addition to its factory, extending the company's efficient manufacturing facilities.

A. H. Petersen Mfg. Co., Milwaukee, has discontinued its tool and die department to concentrate on the manufacture of portable elecric drills and other automotive devices.

Ford Motor Co. may acquire three plants of the government nitrate works at Sheffield, Ala. An inspection tour of the plants has been made by Henry Ford with a view to discovering their practicability for automotive manufacturing.

Lafayette Motors Corp., Indianapolis, has turned over its entire building and housing project to the real estate department of one of the Indianapolis banks.

Automatic Oil Indicator Co., Newark, has been organized to manufacture oil indicating apparatus and other automotive equipment.

Gill Mfg. Co., Chicago, manufacturer of piston rings, reports a sales increase of 45 per cent for the first four months of 1921.

Philadelphia Rubber Works at Buffalo have been sold to the Du Pont Fibersilk Co.

Trustee Is Nominated for Seiberling Property

AKRON, June 20—An arrangement has been entered into by F. A. Seiberling, former Goodyear president, and various of his creditors, whereby it is agreed that a corporation to be known as the Prudential Securities & Realty Co. will assume trusteeship over Seiberling's personal assets and liabilities and will manage his property at least temporarily.

Seiberling's assets, not including his $5,000,000 mansion Stan Hywet Hall, which is said to be in his wife's name, are listed at $10,136,570 and his total liabilities are $6,700,000.

Under the agreement creditors consent to extension of maturity of debts and claims against Seiberling.

Seiberling's largest holdings include Goodyear common and preferred stock, $2,535,430; raw rubber $500,000; Ladysmith Smelting Corp., $1,681,750; Ohio Savings & Trust Co., $144,500; Whitman & Barnes Co., $203,500; Hotel Cleveland Co., $45,000; Blackstone & Fairlawn Heights property, $2,286,475; Morris Plan Bank of Akron, $18,000; old Seiberling home on East Market Street, $82,048; one-half interest in the Delaware building, and appraised value of realty and other assets, $943,686; equity in Central office building of Akron, $160,000; Summit County farm land, $378,202.

TO SELL IMMEL JULY 9.

COLUMBUS, June 18—R. H. Schryver, president of the Citizen's Bank & Trust Co., and receiver for the Immel Co., manufacturers of closed bodies, has been authorized to sell the physical property at public auction July 9. The court issued the court order upon application of the receiver, who believes it is a good time to sell. The preferred stockholders of the company have organized and will be a bidder for the property, which consists of three separate plants and some separate land. The entire property is appraised at $253,200. All materials on hand will be offered for sale and are separate from the plants. No appraisement of the materials has been announced.

RAILROAD DISCONTINUES

WASHINGTON, June 20—Motor vehicle competition is given as the cause for the abandonment by the Ocean Shore Railroad of its lines in California, extending from San Francisco to Tunitas Glen, and from Santa Cruz to Swanton. Authority for abandoning the road was granted to-day by the Interstate Commerce Commission. A lumbering and agricultural territory was served by the carrier.

BANK CREDITS

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, June 23—The local money market was little affected last week by the announcement of the New York Federal Reserve Bank that it had cut its discount rate on commercial paper from 6½ per cent to 6 per cent, making the discount rate now 6 per cent for all classes of bills. The whole financial community as a matter of fact was concerned more with the continued precipitate decline in the stock market, the irregularity and dullness of the bond market, and the unsteadiness of the foreign exchanges. In addition to these unfavorable factors, cotton prices reached the lowest level for several years, and the grain markets were under pressure.

In spite of marked improvement in the great majority of items in the Federal Reserve System's midweek statement, the reserve ratio declined last week from 58.3 per cent to 56.8 per cent. Gold reserves increased $14,896,000, and total reserves $23,078,000. Total bills on hand declined $204,981,000, largely as a result of a $188,680,000 reduction in bills discounted. In spite of the reduction in bills on hand, total earning assets increased $93,261,000 as a result of large government borrowings shown on the statement by a $295,861,000 increase in certificates of indebtedness. Federal Reserve note circulation declined $36,288,000, while deposits increased $194,170,000, which accounted for the lower reserve ratio.

Commercial failures for the month of May show a substantial decline in the number of failures, but a marked increase in the total liabilities involved. The number of failures at 1356, was 131 less than in the previous month, but compares with 547 in May, 1920. Liabilities involved amounted to $57,066,471—the high record for the month of May. In May of the preceding year, liabilities involved for the 547 failures amounted to only $10,826,277. For the first five months of the current year, the total number of failures amounted to 7713, which was exceeded as recently as 1916, but the total liabilities for the five months at $276,032,229 are by far the high record for all time for the five months. The liabilities involved in commercial failures for the first five months of 1920 amounted to only $53,752,911.

U. S. BUYS RUBBER FOR YEAR

NEW YORK, June 18—The United States Rubber Co. is taking advantage of the current price of 16 cents to 17 cents for crude rubber and is laying in a year's supply. Rubber producers assert that the actual cost of producing crude rubber is about 32 cents and that growers are losing money at the current level. The United States Rubber Co. will leave the trees on its own plantations untapped for a year or so, or as long as rubber can be purchased in the open market cheaper than it can be produced.

MEN OF THE INDUSTRY

C. M. Alexander has been appointed manager of the Houston plant of the Ford Motor Co., succeeding W. M. MacDonald, who has resigned. Alexander has been with the Ford Motor Co. in Houston for the last five years and has been assistant manager most of that time. MacDonald will be tendered a Ford agency at some point it is understood. With the early occupancy of the newly-built addition to the plant of the Ford Motor Co., Houston will have the largest Ford assembling plant in any of the southern states, officials state. At the present time the plant is turning out seventy cars per day, which will be increased to more than one hundred as soon as the installation in the new addition is complete.

George J. Fix has resigned as manager of the New Orleans branch of the Bearings Service Co. and will establish in Dallas, Texas on July 1 a sales agency representing the Baldwin Chain & Manufacturing Co. and the Joyce Auto Products Co., covering the State of Texas. Fix was formerly connected with the Maxwell Motor Co., in charge of service for the southwest.

John N. Willys has accepted the appointment on a committee which will organize throughout the country branches of the "Sell Now League." The purpose of the organization is to stabilize economic conditions by selling "now" in selected markets. Willys believes such a campaign is absolutely necessary to hasten the return of normal conditions.

L. O. Haskins, vice-president and general manager of the Powrlok Co. of Cleveland, has become associated with the Seelye & Brown Advertising Agency, Detroit. He was formerly with the O. & S. Bearing Co., Detroit, and later with the Willys interests. He is a member of the Society of Automotive Engineers.

Nelson B. Nelson, formerly superintendent and chief engineer for the Kardell Tractor & Truck Co., St. Louis, and for the past twelve years connected with tractor engineering, has become associated with the New Departure Mfg. Co., and will have charge of engineering at its Chicago office.

A. E. Fauts, who for the past two years has been in Europe in the interests of the Garford Motor Truck Co., has returned to New York, where he will confer with officials of the company on European truck markets and the future policies of the company in that field.

C. E. Wagner, export manager of the Miller Rubber Co., is attending the International Trade Conference in Mexico City. In addition to his representation of the company, he is also representing the Cleveland Chamber of Commerce and the Akron Chamber of Commerce.

Harry W. Anderson has been appointed general sales manager of the Duesenberg Automobile & Motors Co., Inc., Indianapolis. Until recently Anderson was sales manager of the Templar Motors Corp., Cleveland. He will assume his duties with Duesenberg at once.

Ernest M. Orr, plant manager of the Jacox Steering Gear plant of the Saginaw Products Co., has been made assistant to George H. Hannum, president and general manager of the Oakland Motor Car Co. Orr has been associated with Hannum since 1906.

J. Parker B. Fiske has resigned as president and general manager of the Frigidaire Corp., a General Motors Corp. subsidiary. The Frigidaire interests are being merged into the Delco Light Co. and will be under the direction of R. H. Grant, general manager.

M. E. Lyle has been elected a vice-president of the Terminal Engineering Co., Inc., New York. M. E. Peck has been elected secretary and assistant treasurer. J. F. McGonigal and J. H. Potter have joined the engineering staff of the company.

Harry Gardner has retired as manager of passenger car sales for the Packard Motor Car Co. He has not decided upon his plans for the future. Gardner formerly was secretary of the New York Automobile Dealers' Association.

John J. Plath has been made director of sales of the Maxwell Motor Sales Corp., and E. W. Clark, director of sales of the Chalmers Motor Car Corp., according to announcement by A. W. Barker, general sales manager.

George H. Daugherty has been elected a vice-president of Johnson, Read & Co., advertising agents of Chicago. Daugherty has specialized with this company on car, truck and tractor advertising.

J. A. Callahan, vice-president, in charge of production of the Martin-Parry Corp., has been elected vice-president and general manager of the corporation at the annual meeting of the board of directors.

L. J. Ollier, vice-president of the Studebaker Corp. of America, has returned from a trip to Europe, where he has made an investigation of trade conditions.

J. H. Appleby has been appointed a motorcycle tire representative by the Firestone Tire & Rubber Co.

Revere Reorganization Opposed by Stockowner

INDIANAPOLIS, June 20—An order was issued by Judge Geiger in Federal Court yesterday in the suit filed by John B. Porter, of Buffalo, N. Y., a stockholder of the Revere Motor Car Corp., who is seeking to prevent reorgnization.

The order directed officers of the Revere company and the Citizens Loan & Trust Co. of Logansport, Ind., receivers of the corporation, to appear in Federal Court June 22 and show cause why a temporary restraining order should not be issued against them preventing the reorganization or sale of the corporation. The bill also asks for an accounting, alleging that the corporation should have more than $1,500,000 in visible assets, instead of being insolvent.

CHINA DEVELOPS CAR LINES

WASHINGTON, June 17—Progress is being made in China in the way of establishing motor car highways, declares Consul John K. Davis, Nanking, China, in a report which has been received by the Bureau of Foreign and Domestic Commerce. Previous reference has been made by Consul Davis to the establishment of a motor car service between Pochow, Anhwei, in the Nanking consular district, and Techow, Honan, and he reports four other similar services are either in the process of being established or are definitely planned. It is stated that American exporters desirous of cultivating the automobile market in the Nanking consular district, said to be rapidly growing, can do so to the best advantage by establishing branches or agreements in Shanghai.

Receivers Are Named for Ideal Tire Company

CLEVELAND, June 20—On the application of Edward Maurer of New York, who furnished the company with much of its supply of fabric, Federal Judge D. C. Westenhaver has appointed Newton D. Baker, former secretary of war, and Edward L. Griffith, well known business man and financier, receivers for the Ideal Tire and Rubber Co.

The assets of the company are placed at $1,660,000 and the bills payable amount to $700,000, most of which is due on materials bought at prices far above the level of to-day. A short time ago, it was announced that the company owed but $114,000 exclusive of the money due for materials and that approximately $500,000 was owing on rubber fabric that was purchased at $3.10 a pound. The price now is about 80 cents a pound.

The factory is employing approximately 200 men and women now and the receivers will continue to produce tires, for which there has been a good demand. The corporation was organized in 1917 with a capital of $5,000,000. A factory was built and production started early after the organization.

Seek $10,000,000 for New Mexican Highway

SAN ANTONIO, TEXAS, June 20—The Highway Propaganda Committee of the Meridian Highway Association, has left Laredo, Tex., for an automobile tour to Mexico City to further the proposed Mexican highway through the States of Tamaulipas, Neuve Leon, Coahuila, San Luis Potosi, Guanajuato, Queretaro, Hidalgo and Mexico. The road, which will be over 1000 miles in length, will cost in excess of $10,000,000 Mexican currency.

The road party will endeavor to finance the road. It is proposed that the Mexican government furnish 40 per cent of the cost of construction and assess an automobile tax which will bring in about $2,500,000. The remainder, about $3,500,000, is to be raised by subscriptions along the run.

MINNEAPOLIS TO HAVE SHOW

CHICAGO, June 20—A tractor show will be held during the coming winter in Minneapolis by the National Implement & Vehicle Association under the Show and Demonstration Committee, headed by Chairman J. G. Bartholomew. This committee has also agreed to have a tractor show during the winter at some point in the Southwest, either at Kansas City or another place where suitable arrangements can be made. Last winter the tractor show was held at Columbus, Ohio.

Calendar

SHOWS

Sept. 5-10—Indianapolis, Automobile and Accessory Show in conjunction with Indiana State Fair, conducted by Indianapolis Automobile Trade Association, John B. Orman, Mgr.

Sept. 28 - Oct. 8 — New York, Electrical Exposition, 71st Regt. Armory, Electric Equipment, Machinery and Vehicles.

Nov. 27-Dec. 3—New York, Automobile Salon, Hotel Commodore.

January — Chicago, Automobile Salon, Hotel Drake.

FOREIGN SHOWS

June, 1921—Reykjavik, Iceland, Agricultural Exhibition—Agricultural Machinery—Icelander Agricultural Society, Reykjavik, Iceland.

September—Buenos Aires, Argentina, Passenger Cars and Equipment. La Pabellon de las Rosas. Automovil Club Argentino.

September—Buenos Aires, Argentina, Cars, Trucks, Tractors, Farm Lighting Plants and Power Farming Machinery. Palermo Park; Sociedad Rural Argentina.

September—Luxemburg, Luxemburg, Agricultural Sample Exhibition.

Sept. 23-Oct. 2—Berlin, German National Automobile Show, Auspices of German Automobile Mfg. Ass'n and German Automobile Club.

Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais, Administration de l'Exposition Internationale de l'Automobile, 51, Rue Pergolèse, Paris.

Nov. 4-12 — London, British Motor Show, Society Motor Mfrs. and Traders.

May, 1922—Quito, Ecuador, Agricultural Exposition, celebrating Centenary of Ecuador. Automotive Section.

CONVENTIONS

July 4-9 — Mackinac Island, Mich., Summer Meeting Automotive Equipment Association.

Oct. 12-14, 1921 — Chicago, Twenty-eighth Annual Convention National Implement & Vehicle A'ssn.

Nov. 22—New York, Convention of Factory Service Managers, National Automobile Chamber of Commerce.

Dec. 27-29—Chicago, American Society of Agricultural Engineers, Auditorium Hotel.

RACES

July 25—Grand Prix, Le Mans.

Labor Day—Uniontown, Pa., Autumn Classic.

Commission to Clarify Aeronautical Situation

WASHINGTON, June 21—As a step toward clarifying the aeronautical situation, Herbert Hoover, Secretary of Commerce, has agreed to appoint an Aviation Consulting Commission which will present for the consideration of President Harding a policy for the advancement of aeronautics in this country. This action followed a petition to the President by 50 executives representing civilian aviation organizations throughout the country.

The petitioners included Glenn H. Curtiss, Glenn L. Martin and C. F. Redden, and such organizations as the Aero Club of America, the Manufacturers' Aircraft Association, the National Aircraft Underwriters' Association, the Society of Automotive Engineers and the National Advisory Committee for Aeronautics. They asked for a commission to study and outline a report dealing with America's future in the air, a general policy for the Government to follow in developing civilian aviation, suggestions for air routes and termini and recommendations for aerial laws.

Borah Offers Measure to Abolish Air Board

WASHINGTON, June 18 — Senator Borah of Idaho, has introduced a joint resolution which would abolish the organization known as the National Advisory Committee for Aeronautics, and transfer its property and duties to existing governmental agencies. It is expected that a fight will develop when this measure is reported from the Committee on Military Affairs, for the Advisory Committee for Aeronautics has functioned as an independent agency.

The joint resolution provides that in the abolition of the committee, the technical duties that have heretofore been carried on by the body, or that have heretofore by law been charged to the body, be transferred to the Department of Commerce, to be carried out by the Bureau of Standards. It is also provided that the technical equipment now in the possession of the National Advisory Committee for Aeronautics be transferred to the Department of Commerce, Bureau of Standards. The duties of this committee as relate to its advisory capacity on the subject of aeronautics would be transferred to the War Council, as created by the national defense act approved June 3, 1916, as amended by acts subsequent to June 3, 1916, to and including the act of June 4, 1920.

Kerosene Carburetor Is Demonstrated Here

NEW YORK, June 17—Mr. Mandahl, a Swedish inventor, has arrived in this country with samples of the Kjellberg kerosene carburetor, a device adaptable to use on trucks, tractors and other automotive vehicles. He has fitted the carburetor to a Republic truck and is giving demonstrations with same.

The general principle of the device is that a mixture of kerosene spray and air is formed in the mixing chamber and the kerosene mist is then vaporized while passing through a copper pipe surrounded by an exhaust heating chamber. This stream of over-rich mixture is later diluted with additional air entering through a supplementary air valve, passes through a throttle valve and through a change-over valve to the engine. By means of the change-over valve the engine can be connected to a gasoline carburetor for starting and for heating up. A full description and a diagrammatic illustration of the carburetor appeared in the Sept 16, 1920, issue of AUTOMOTIVE INDUSTRIES.

FIX BRITISH SHOW DETAILS

LONDON, June 10 (By Mail)—The big British automobile show will be held simultaneously at Olympia and White City from Nov. 3 to 12. The truck show will be held Oct. 13 to 22. Arrangements have been made whereby accessory exhibitors who have space in the gallery at Olympia for the truck show may retain the same space for the passenger car exhibit. No changes in prices will be permitted while the shows are in progress. Tractors will be admitted to the truck show if they are provided with means for traveling the roads and are licensed for that purpose.

Transportation Situation Shows Gains for Trucks

WASHINGTON, June 17—One of the outstanding developments of the present transportation situation has been the growth of the automobile truck in short hauls, making it a formidable competitor of the steel rail, according to Archer Wall Douglas, chairman of the committee on statistics of the Chamber of Commerce of the United States, in his semi-annual report on business conditions. He also stressed the fact that there has been some increase in the output of automobiles, notably in certain localities. He finds that purchasing power is still high, despite many untoward conditions and that there is still money to be spent where bargain prices are in evidence. The committee advises American business that there is no immediate return to prosperity in sight, at least until the termination of the harvest season.

Gasoline Railway Cars Keeps Operation Low

LOUISVILLE, June 18—The Carrollton & Worthville Railroad Co., operating a strip of road ten miles long, is the only company operating in Kentucky which has not raised passenger fares since the depression period began.

This company solved the problem by shelving its steam locomotives and substituting gasoline motor vehicles. The cars, have attracted the attention of short line railroad companies as far south as Louisiana and as far west as New Mexico. Automobile manufacturers have studied them with a view to their practicability for adaptation to street car service.

Operation of one of these cars for one round trip costs $2, counting repairs, labor, gas, oils and depreciation. The trip with a steam locomotive costs from $15 to $18.

PERFECTION SUIT DROPPED

WILMINGTON, Del., June 20.—The receivership proceedings brought in the United States Court here against the Perfection Tire & Rubber Co. of Detroit, by the Southwark Foundry & Machine Co. of Philadelphia, have been dropped.